February 15, 1961
Vol. 138 No. 4

Journal

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION

Phosphorus Compounds for Parasites in Swine

AN EVALUATION of some of the organic phosphorus compounds used in the chemotherapy of certain parasitisms of swine. Page 179

Prevalence of Mastitis During Lactation

THIS REPORT correlates the occurrence of mastitis attacks with the different stages of lactation and hormonal variations in cows. Page 184

White Muscle Disease in Lambs

SELENIUM was effective in the treatment of lambs for the prevention of white muscle disease. Page 188

Portocaval Shunt for Acites in a Dog

SURGERY, involving a portocaval shunt, was successful in correcting canine acites which did not respond to routine therapy. Page 200

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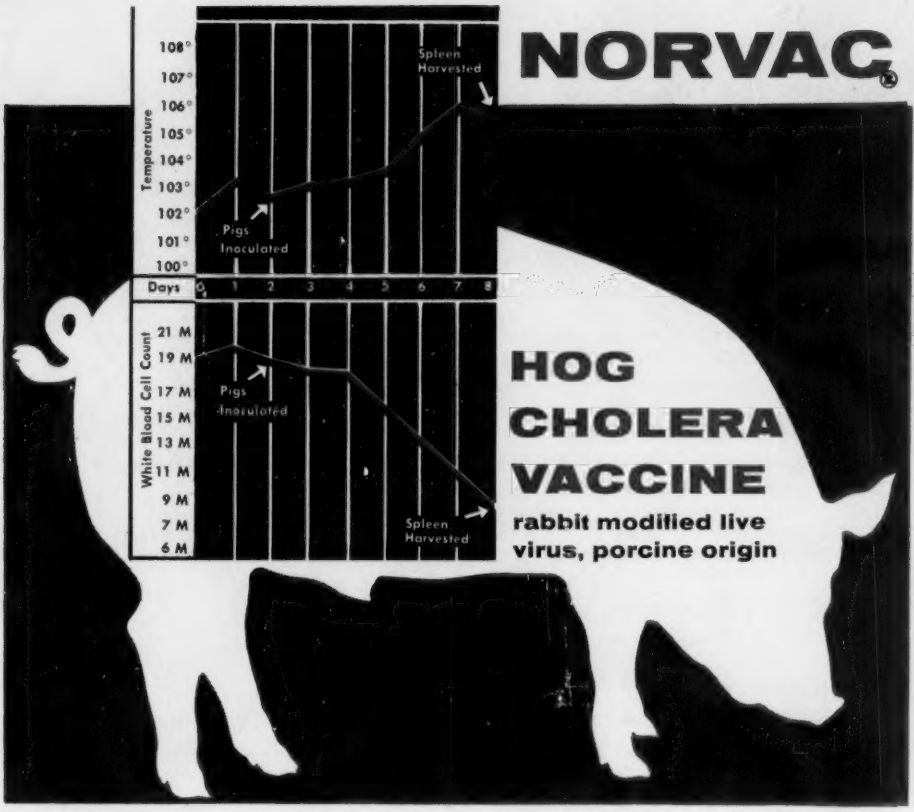

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Vol. 138 No. 4 Feb. 15, 1961

CONTENTS

ARTICLES ON LARGE ANIMALS

Observations on the Control of *Haematopinus suis and* and *Ascaris lumbricoides* of Swine with Certain Organic Phosphorus Compounds—*DeLeon—Turk—Hale* 179
Prevalence of Bovine Mastitis During Various Stages of Lactation—*Norma A. Frank and W. D. Pounden* 184
Effect of Selenium on White Muscle Disease in Lambs—*A. Lagace* 188

ARTICLES ON SMALL ANIMALS

Experimental Feline Viral Rhinotracheitis in the Cat—*Crandell—Rehkemper—Niemann—Ganaway—Maurer* 191
Susceptibility of Cats to Phenol—*Ernst—Klesmer—Huebner—Martin* 197
Use of the Portocaval Shunt in the Treatment of Acites in a Dog—*Keefe—Mason—Boria* 200

ARTICLE ON LABORATORY ANIMALS

Chronic Arteritis in the Laboratory Rat—*Bernard H. Skold* 204

GENERAL ARTICLE

Industry Looks at the Food Additives Amendment—*W. Brooks Fortune* 208

EDITORIAL

Exotic Diseases on the Move—*Fred D. Maurer* 214

FEATURES

Correspondence ..... adv. p. 4
Report of Officers—*E. E. Leasure* ..... adv. p. 8
Washington News ..... adv. p. 10
What Is Your Diagnosis? ..... adv. p. 27
History of the AVMA ..... adv. p. 38

Contents continued on adv. page 4

EDITORIAL STAFF: D. A. Price, *Editor in Chief;* A. Freeman, *Assistant Editor;* H. E. Kingman, Jr., *Managing Editor;* R. G. Rongren, *Advertising Manager;* Eva G. Bailey, *Production Manager and Assistant to the Editors.*
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Correspondence

Gel Diffusion vs. Fluorescent Antibody Test for Rabies Diagnosis

Dec. 9, 1960

Sir:

The Sept. 1, 1960, issue of the *J.A.V.M.A.* brings to the attention of United States veterinarians a wonderful method of diagnosing rabies, *i.e.*, the fluorescent antibody method.

Its main advantage lies in its speed. Chief disadvantages are need of a well-equipped laboratory and skilled technicians and the necessity of using fresh or frozen tissues. These disadvantages preclude use of the method in laboratories in many countries of the world, where, unfortunately, rabies is prevalent.

It is for these reasons that another technique has been developed which has been used in Africa for nearly 3 years. It consists of gel diffusion in petri dishes of a hyperimmune rabies serum and rabies-suspected material which results in formation of visible lines of precipitation. Controls can be included in the test. The serum is produced in donkeys by using HEP then LEP Flury virus; the antigen is brain material of rabid animals. A positive reaction is evidenced by 2 lines of precipitation; where the reaction is negative, precipitation is absent.

Complete information on methods used have appeared in the literature.[7-10] The main advantages of this technique are speed (slower, however, than the fluorescent antibody technique, as it requires 24 hours), accuracy, simplicity, and the fact that it can be used even with putrid material, an important consideration in Africa.

The method is now used routinely in our laboratory, as well as in the Pasteur Institute in Cambodge.[6] Its usefulness has been acclaimed in France,[1] Germany,[2,4] India,[5] and Yugoslavia.[3] No doubt it should prove useful in the United States also, especially for ecologic studies of rabies.

S/A. PROVOST, DOCT. VET. DIPL. BACT. AND IMM. (INST. PAST.)

J-M. VILLEMOT, DOCT. VET. DIPL. BACT. AND IMM. (INST. PAST.)

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Fort-Lamy (Tchad), Africa

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(Continued on adv. p. 6)

CONTENTS—continued

ITEMS

Visceral Larva Migrans in Swine 183
An Anesthetic Mixture for Animals ... 187
Electrical Anesthesia 187
Transmission of Immunity to Tetanus from Ewe to Lamb 190
Canine Emphysematous Cystitis Uncommon 196
Cecal Enlargement in Germ-Free Animals 199
Oxygen Antidote for Local Anesthetic Drug Toxicity 213
Long-Term Effect of Ultrasonic Energy on Dogs 215
Tissue Culture on Polyethylene 215

from the RESEARCH JOURNAL

Phase Differences in Uterine Response 216
Mobilization of Leukocytes in the Uterus 216
Infectious Meningo-Encephalitis in Cattle 217
Effects of Temperature on PMS 217
Effects of Testicular Biopsy 217
Teniacides in Dogs, Cats, and Chickens 218

NEW BOOKS

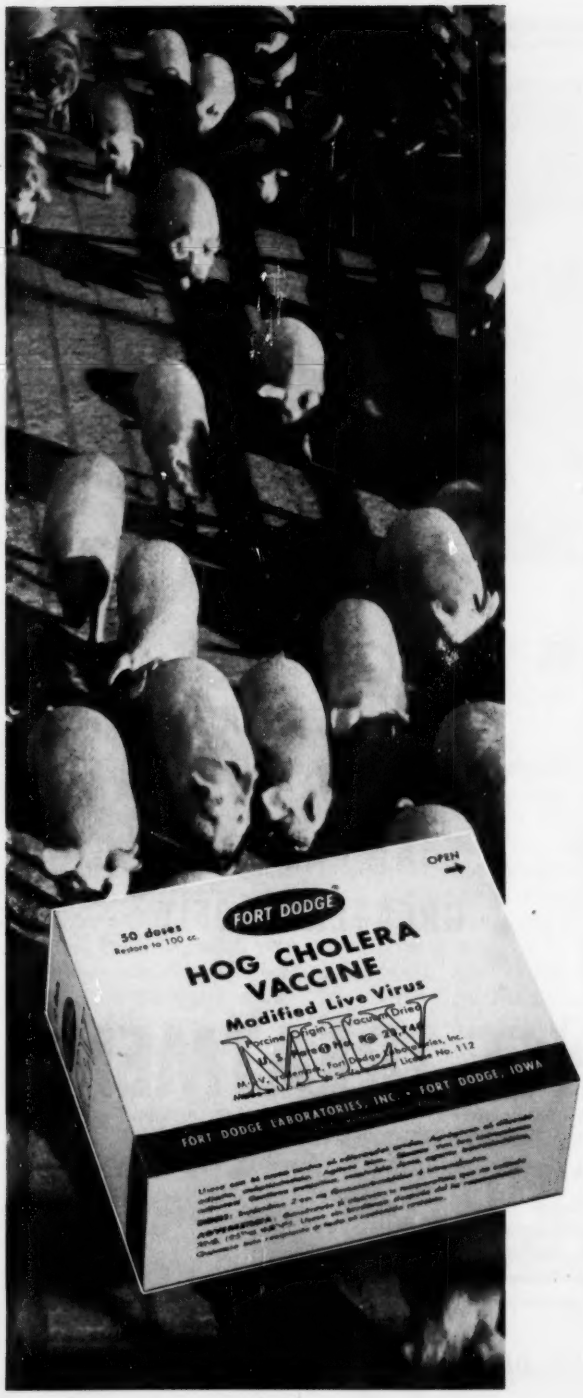
Minks: Diseases and Parasites 218
Report WHO Committee on Rabies 218

NEWS

Scope of Veterinary Medicine Reviewed 219
AVMA President-Elect Views Profession's Future 219
Continuing Education Studied 220
Animal Nutrition Topic of Conference .. 221
NAR Committee on Primates Reorganized 221
New Group for Veterinary Parasitologists 221
Trans-Oceanic Conference Panelists Selected 222
Veterinarian from Poland Visits AVMA 222
Recent AVMA Research Fellows—Reuber, Ristic, Moore, Hruska 223
AEC Appoints Dr. W. G. Magrane as Consultant 225
Dr. M. G. Fincher Reports on Veterinary Medicine in South America 226
Pullorum Eradication Subject of Special Meeting 227
Dr. Dale Suplee Transferred to New York 227
Dr. O. D. Corson Appointed to USDA Washington Staff 228
Among the States and Provinces 228
Veterinary Military News 231
Deaths 232
Women's Auxiliary 234

ORGANIZATION

AVMA Council on Education .... adv. p. 40



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Proceedings of Business Sessions

Jan. 6, 1961

Dear Sir:

Have recently received my copy of the "AVMA Proceedings of the Business Sessions" held at Denver last summer and want to compliment the staff for getting it out so promptly. I am greatly impressed by the information given under some sections.

In reviewing a report of this kind and looking back 30 years one is greatly impressed how our Association has expanded not only in size but also in its activities and quality of service that it is rendering to agriculture and the general public.

s/Henry Van Roekel, D.V.M., M.S., Ph.D.
Amherst, Mass.

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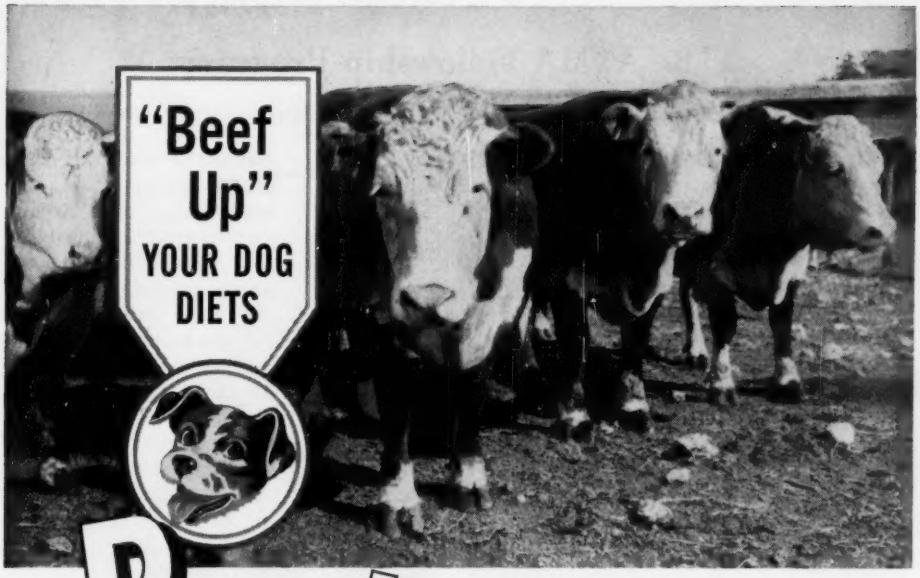

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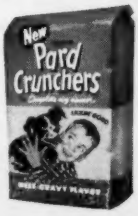

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The AVMA Fellowship Program

Dr. E. E. Leasure, President

The greatest single problem facing any profession is the continued improvement of the educational programs of its members. The AVMA has long recognized this fact and has dedicated its services to the improvement of the undergraduate, graduate, and continuing education program of its members.

The AVMA Council on Education, established in 1945, has worked very closely with the veterinary schools and has contributed greatly to the undergraduate program. Some years later, the Council on Research was established and given specific responsibilities in this area and, upon recommendation of this Council, the AVMA Research Trust Fund was established to receive contributions from the members and other interested parties. To date, the resources of this fund have been used by the Council on Research in inaugurating a graduate education program known as the AVMA Fellowship Program.

The aim of the AVMA in this respect is to encourage research in all phases of veterinary medicine, that the profession may better serve the public now and in the future. One basic need is for people with interest in and understanding of the problems in veterinary medicine, and for minds trained in the discipline of research and in research techniques. These scientists are needed to conduct research programs, to teach the fundamentals of veterinary medicine, and to inspire others to serve in this field.

The AVMA Fellowship Program, therefore, is one of financial aid to selected veterinarians to help them to secure the additional training needed for a career in research or teaching in any discipline within the broad field of veterinary medicine. The stipends to these fellows are variable and based upon the needs of the students, but only under exceptional circumstances exceed $5,000 per year. Since its inception, approximately 68 veterinarians have received grants for graduate training under this program and many of those who have completed their program are now employed in schools of veterinary medicine.

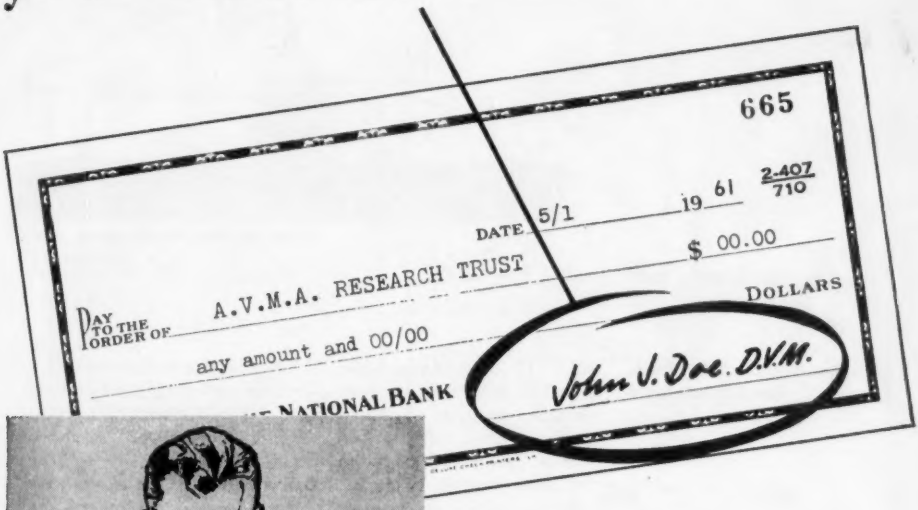
Last year it became apparent that if the program were to continue, a special effort to secure additional funds must be made. The AVMA, therefore, requested the Women's Auxiliary to conduct a fund-raising campaign in the United States and Canada; the Auxiliary accepted the challenge and, through cooperation with the AVMA, set the goal at $75,000 and the starting date as Feb. 1, 1961. The Auxiliary proposes to contact each individual veterinarian for contributions and complete its drive by the end of February.

I am certain that the entire membership is aware of many of the accomplishments of research workers in the past and of the direct benefits to the public and to the profession. I am equally certain that the entire membership recognizes the importance of a continuing research program into the many problems facing the profession and the need for highly qualified individuals to teach the fundamentals of veterinary medicine to our students.

Contributing to this program is like investing in guaranteed securities; accrued benefits will be returned to the public, to the profession, and to you many times over. Please help the Auxiliary in this important program.

E E Leasure

your name here



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news from Washington . . .

FROM THE AVMA WASHINGTON OFFICE
J. A. McCallam, VMD
Brig. Gen. USA (Ret.)

THE FOLLOWING BILLS HAVE BEEN INTRODUCED IN CONGRESS:

Voluntary Pension Plans for Self-employed

H. R. 10, Rep. Keogh, (D., N.Y.)—To encourage establishment of voluntary pension plans by self-employed individuals. An analysis of current *H. R. 10* by American Thrift Assembly states "it adopts the better features of Senate Finance Committee bill of 86th Congress and omits most of its objectionable features." Bill provides (1) plan for employees where employer has *more than* 3 employees (excluding seasonal or part time) (2) a waiting period not exceeding 3 years, for employees to come under the plan, (3) a formula for application against "self-employment earnings," and (4) a bond purchase plan. This would permit self-employed to buy bonds directly or through his trust. There is no acceleration provision for persons over age 50 and no lifetime limit on contributions. The employee's rights must be nonforfeitable for the plan to qualify in such cases where there are *more than* 3 employees and the plan covers any "owner-employees." *S. 474*, Sen. Bennett (R., Utah) is a bill identical with Keogh measure. *S. 59*, Sen. Smathers (D., Fla.), is somewhat similar to *H. R. 10*, in which there is at least one marked difference to the Keogh bill. Former adopts the principle that for every $1.00 permitted to be set aside for retirement, $.50 would be taxable and $.50 would be tax deferred, and therefore would change the contribution limits to 20% of earned income or $5,000, whichever is less. Additional information on the Smathers bill will appear in the JOURNAL March 1, 1961.

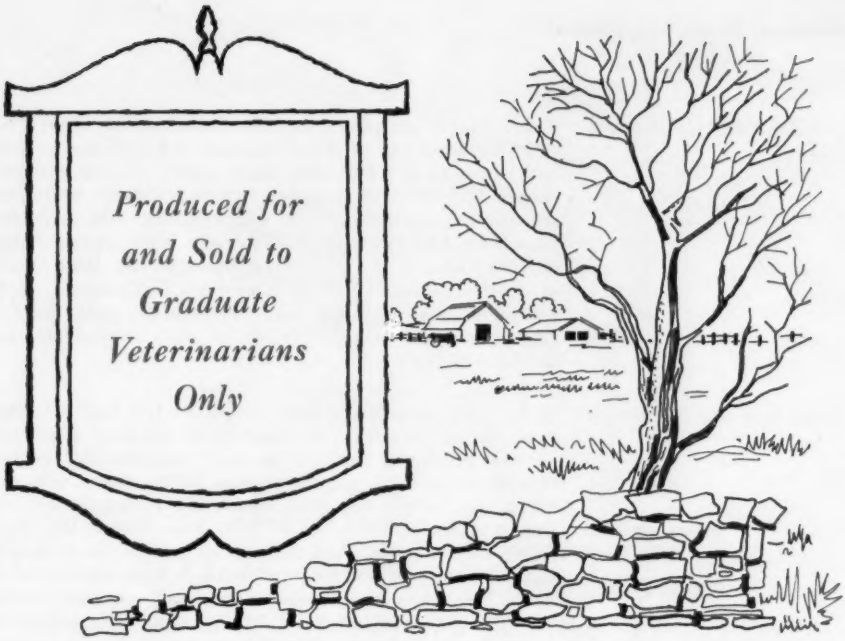
Humane Treatment of Animals Used in Experiments

H. R. 1937, Rep. (Mrs.) Griffiths (D., Mich.)—Provides for humane treatment of animals used in experiments, and tests by recipients of grants from the United States and by agencies and instrumentalities of the government. It is substantially the same as *S. 3570*, so-called Cooper bill, introduced in the 86th Congress by Senator Cooper (R., Ky.) and 12 co-sponsors.

Construction of Veterinary Schools

H. R. 2451, Rep. Andrews (D., Ala.)—To authorize a ten-year program of grants for construction of veterinary medical educational facilities.

(Continued on adv. page 12)



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USDA Budget and Research

USDA budget submitted to 87th Congress for fiscal year 1962 included for all direct research A.R.S. under salaries and expenses $79,620,000; plant animal disease and pest control $55,045,000 (includes $19,640,500 for brucellosis eradication); meat inspection, $23,801,000; A.M.S., poultry inspection, $12,491,700. *S. 192*, Sens. Williams and Boggs (R., Del.) also *H. R. 2714*, Rep. Johnson (D., Md.), would establish a poultry research laboratory in Delaware; *H. R. 890*, Rep. Abernethy (D., Miss.), to help the states provide additional facilities for research at state argricultural experiment stations.

Food, Drug and Cosmetic Act

H. R. 1235, Rep. (Mrs.) Sullivan (D., Mo.) to further amend Food, Drug, Cosmetic Act relative to labeling provisions; require adequate controls in drug manufacture; require new drugs and therapeutic devices to be shown safe and efficacious before marketed commercially; require all antibotics to be certified. *H. R. 828*, Rep. Multer (D., N.Y.) would authorize the President, under certain conditions, to control, regulate, and allocate the use and distribution of medicinal substances. Latter means any vaccine, serum, medicine, chemical, or other substance used for prevention or treatment of disease. Provides for fixing of price ceilings.

Federal Aid to Education

A number of bills introduced would provide federal aid to higher education such as scholarship programs, fellowship grants, loans to educational institutions for construction of academic facilities. One, *H. R. 27*, Rep. Fogarty (D., R. I.) would authorize 10-year program of grants for construction of medical, dental, and public health educational facilities; another, *H. R. 1136*, Rep. Bennett (D., Fla.), to facilitate procurement of physicians and dentists for the armed forces by providing grants and scholarships for education in the medical and dental professions.

Social Security Act

Bills to amend Title II Social Security Act are numerous. *S. 65*, Sen. McNamara (D., Mich.), similar to Forand bill in last Congress relative to hospital care, nursing home service, etc., but McNamara measure would provide coverage for those *outside* Old Age Survivors and Disability Insurance (OASDI) as well. Included among sponsors of bills placing medical elder care under social security are Reps. Holland (D., Pa.), Dulski (D., N.Y.), Gilbert (D., N.Y.), and Ashley (D., Ohio). Among many bills to increase the limitation upon outside income earned while receiving social security benefits or remove limitation are *H. R. 169, 518, 524, 642, 713, 1018, 1757, 2018 and S. 12, 64, 390.*

Unsanitary Milk and Milk Products

H. R. 50, Rep. Johnson (D., Wis.) to amend P.H.S. Act to protect public from unsanitary milk and milk products shipped interstate, without unduly burdening commerce; *S. 212*, sponsored by Sens. Humphrey, McCarthy, Proxmire, and Wiley, is identical with Johnson bill.

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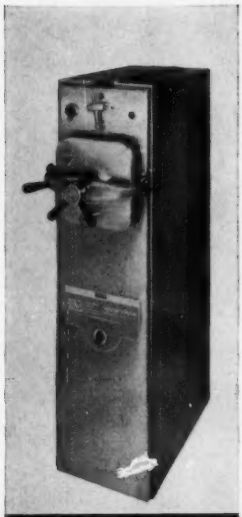

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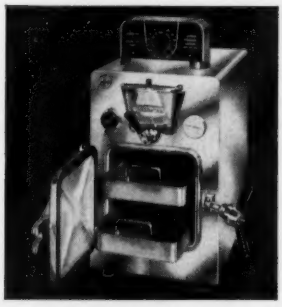

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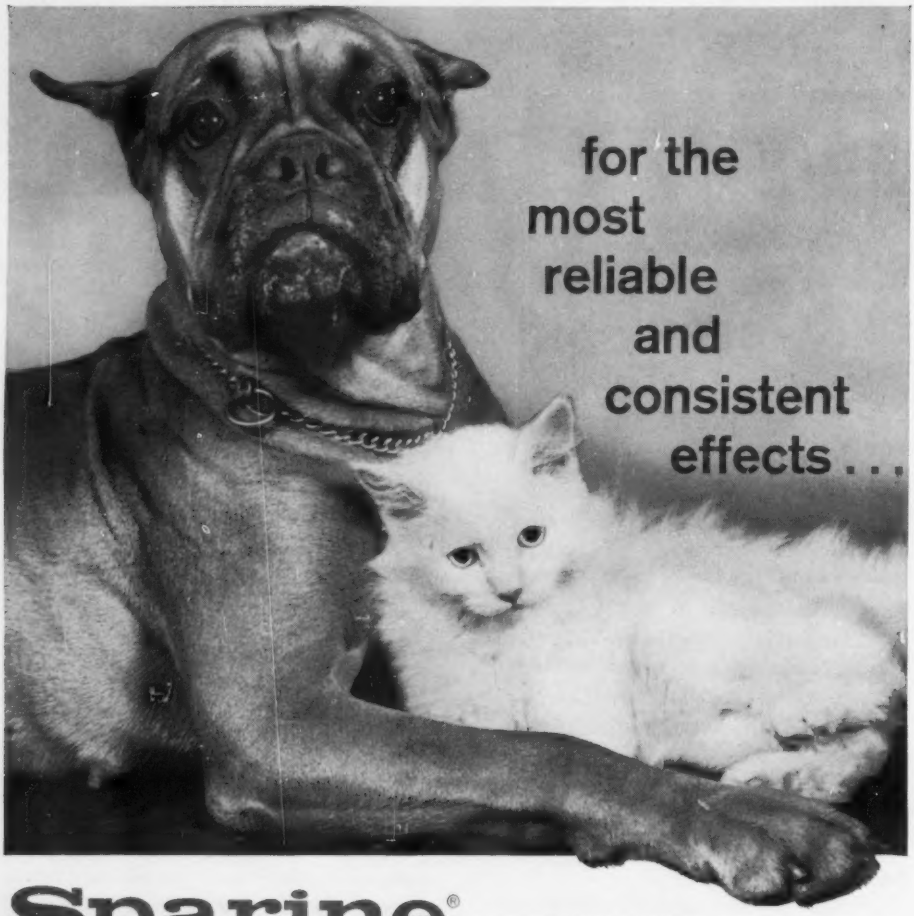

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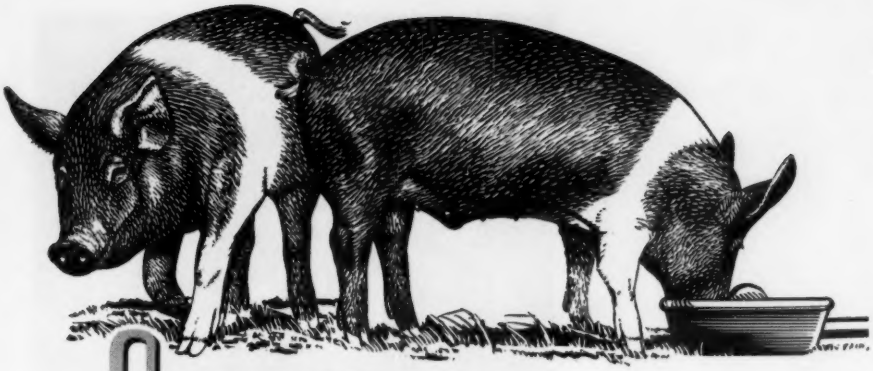

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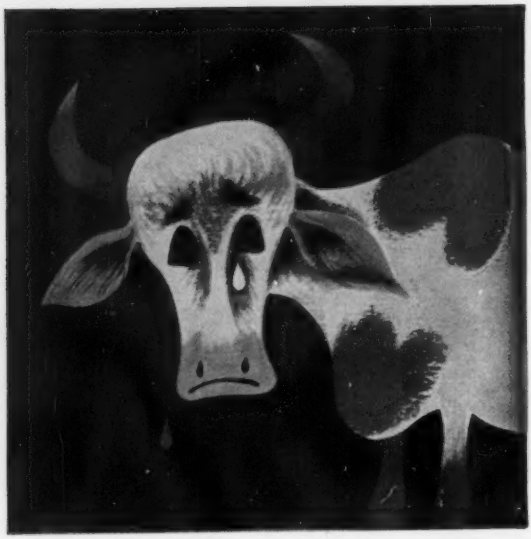

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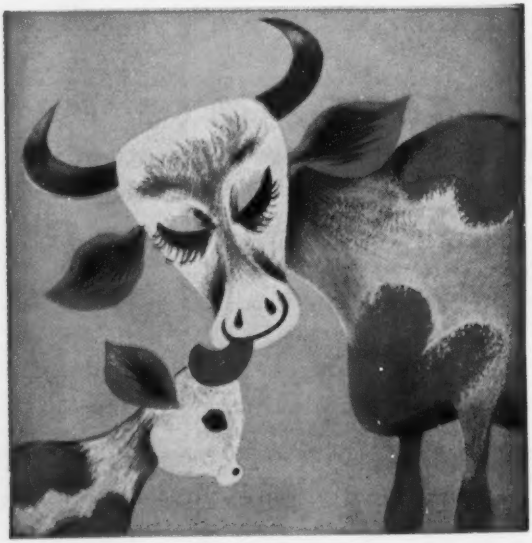

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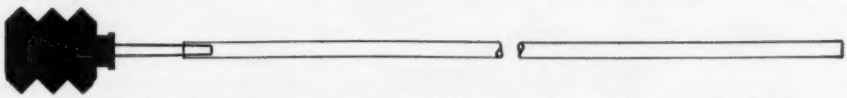

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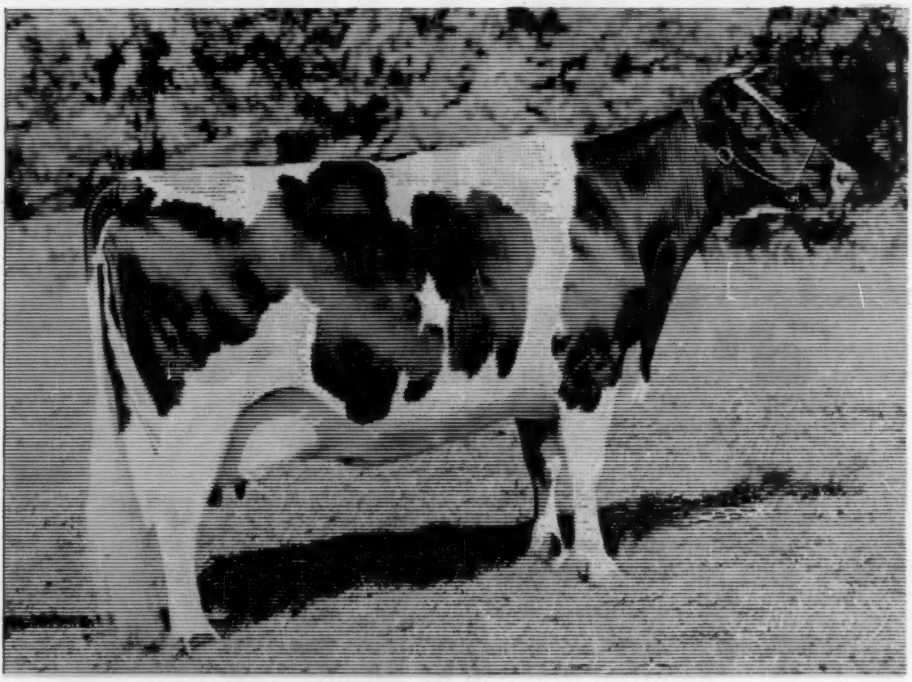

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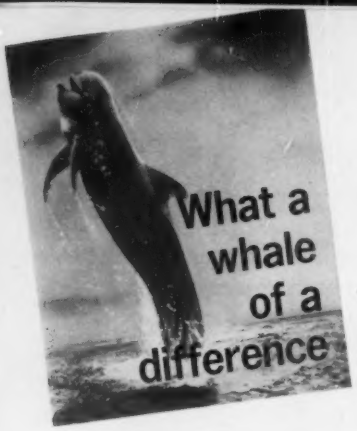

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Journal

OF THE
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Observations on the

Control of Haematopinus suis and Ascaris lumbricoides of Swine

with Certain Organic Phosphorus Compounds

D. D. De LEON, D.V.M.
R. D. TURK, D.V.M., M.S.
Fred HALE, B.S., M.S.

ORGANIC phosphorus compounds are among the principal groups of organic compounds being extensively used in the chemotherapy of certain parasitisms. Several reports exist on their use in the control of certain anthropod parasites of dogs[7,15] and certain arthropods[1-3,4-6,11,14,16,17,20] and nematodes of ruminants.[2,8-11,13]

Bayer 21/199 (25%),* when applied as a spray at 0.5 per cent concentration on cattle, has been reported to be an effective systemic parasiticide for the control of grubs.[1,6,12,14] The efficacy of this drug as an anthelmintic in cattle and sheep [9-11] also has been tested. It was reported that the material, when given at 25 mg./kg. of live weight in cattle, was highly effective for *Strongyloides papillosus* and species of the genera Haemonchus, Trichostrongylus, Cooperia, Trichuris, and Capillaria.[10] Studies on sheep, using 25, 35, 40, and 50 mg./kg. of body weight of the chemical as a rumenal injection, indicated that it was effective against *Haemonchus contortus*, Trichostrongylus spp., and *Oesophagostomum columbianum*.[9]

Another organic phosphorus compound, Bayer L 13/59 (80%),** when administered orally to cattle at 50 to 100 mg./kg. of body weight, was also an effective systemic insecticide for grubs.[5,12] The compound, when applied as a spray at 0.25 to 1.0 per cent concentration, was highly efficient against *Haematopinus eurysternus*.[16] This chemical has been tested as an anthelmintic in cattle and sheep.[9,11,13] It

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This paper represents a portion of a thesis, "The Relation of Certain Organic Phosphorus Compounds on the Cholinesterase Activity and Their Value as Parasiticides in Swine," presented to the A. & M. College of Texas in partial fulfillment of the requirements for the Master of Science degree.

*Co-Ral (25% Bayer 21/199), supplied by the Chemagro Corp., New York, N.Y.

**Dylox (80% Bayer L 13/59), supplied by the Chemago Corp., New York, N. Y.

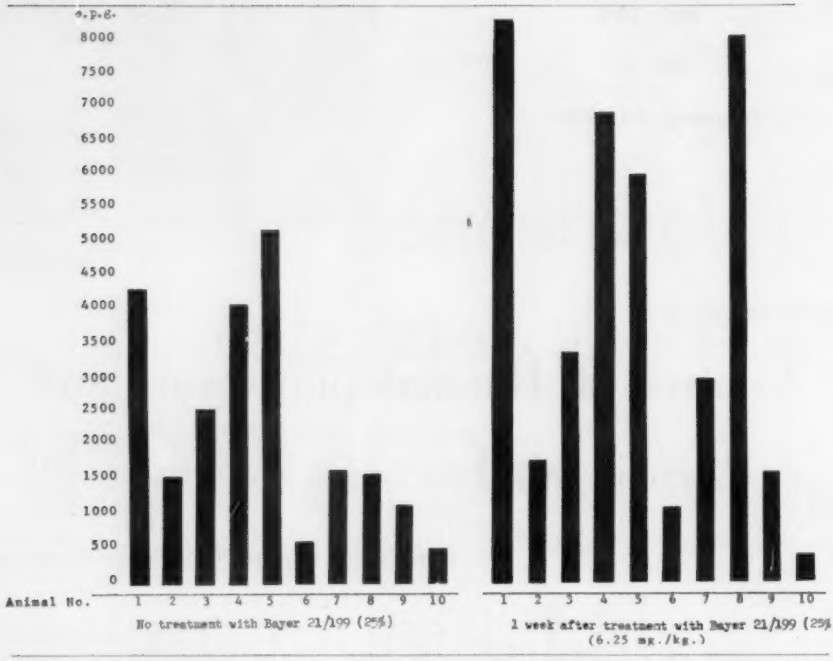

Fig. 1—Effect of a single, oral, nontoxic dose of Bayer 21/199 (25%) on e.p.g. of *Ascaris lumbricoides* of swine.

was reported that 110 and 165 mg./kg. of the chemical given orally to calves and sheep, respectively, was effective in lowering the number of parasite eggs per gram of feces. (e.p.g).[7,13]

No report on the value of the organic phosphorus compounds as parasiticides in swine could be found in the available literature.

Therefore, it seemed worthwhile to investigate the potential value of certain organic phosphorus compounds as parasiticides in swine. The results of this investigation are reported.

Materials and Methods

Two organic phosphorus compounds were used in this study: Bayer 21/199 (25%)—0, 0-Diethyl 0-(3-chloro-4-methyl-7-coumarinyl) phosphorothioate, and Bayer L 13/59 (80%)—0, 0-dimethyl-1-hydroxy-2,2,2-trichloroethylphosphonate.

It was determined earlier in conjunction with this study that Bayer 21/199 (25%) and Bayer L 13/59 (80%) at 0.25 and 0.5 per cent concentrations apparently were nontoxic to 3-day-old, 2-month-old, and 6-month-old pigs when applied as sprays. It was also observed that Bayer 21/199 (25%) given orally in capsules at 6.25 mg./kg. of body weight was nontoxic to 3-day-old, 2-month-old, and 6-month-old pigs, and Bayer L 13/59 (80%) at 50 and 100 mg./kg. was nontoxic to 2-month-old and older pigs. Therefore, these concentrations and doses were used in evaluating these compounds as parasiticides for swine.

A total of 44 pigs were used in this study, 20 pigs, 20 days old, and 4 pigs, 5 months old, heavily infested with lice, and 20 pigs, 5 months old, naturally infected with *Ascaris lumbricoides*.

The 20 pigs, 20 days old, were allotted to 4 lots of 5 pigs each. Those pigs in lot 1 were sprayed with 0.25 per cent Bayer 21/199 (25%), those in lot 2 with 0.5 per cent Bayer 21/199 (25%), those in lot 3 with 0.25 per cent Bayer L 13/59 (80%), and those in lot 4 with 0.5 per cent Bayer L 13/59 (80%).

Insecticidal effects of the chemicals were recorded. About 4 hours after treatment, pigs were returned to their respective dams which were heavily infested with lice. The pigs were examined daily for reinfestation.

The 4 pigs, 5 months old, that were heavily infested with lice were placed in separate pens. A total of 100 unhatched lice eggs were collected from the

4 pigs. Pig 1 was then sprayed with 0.25 per cent Bayer 21/199 (25%), pig 2 with 0.5 per cent Bayer 21/199 (25%), pig 3 with 0.25 per cent Bayer L 13/59 (80%), and pig 4 with 0.5 per cent Bayer L 13/59 (80%). One day after treatment, 100 unhatched eggs were collected from each pig.

The eggs were collected by cutting the hair, to which they were attached, close to the skin. The empty shells which were attached to the hair with the unhatched eggs were removed with a pair of tweezers and a dissecting needle. Care was taken in handling the treated eggs to prevent the possible removal of the film of insecticide that might be coating them.

The eggs were placed in labeled Petri dishes. A few drops of water were spread on the inner surface of the upper lids of the Petri dishes which were then incubated at 39 C. After 21 days, the eggs were examined for hatchability, and the percentage of ovicidal activity of each insecticide was determined. Some of the eggs that did not hatch were placed on glass slides, and several drops of lacto-phenol solution were placed on the eggs to clear the shells. After 30 minutes, the eggs were examined under a microscope.

The 20 pigs, 4 months old, naturally infected with large roundworms, were numbered, weighed individually, and allotted to 4 lots of 5 pigs each. A generous amount of fecal matter was collected from each pig to establish the pretreatment e.p.g. of *Ascaris lumbricoides*. The dilution egg counting, small drop and displacement method described by Stoll and Hausheer,[18] was followed. Pigs in lots 1 and 2 were given an oral dose of Bayer 21/199 (25%), 6.25 mg./kg. Those in lots 3 and 4 were given oral dosages of 50.0 and 100.0 mg./kg. body weight of Bayer L 13/59 (80%), respectively. The swine were observed daily and, a week after medication, e.p.g. were determined. The e.p.g. of the pigs in lots 3 and 4 were again determined 2 weeks after treatment to continuously ascertain the anthelmintic efficiency of Bayer L 13/59 (80%).

Results and Discussion

All of the lice, both nymphs and adults, were dead within 5 to 10 minutes after the spraying of 0.25 per cent and 0.5 per cent solution of Bayer 21/199 (25%) and of Bayer L 13/59 (80%). The longest period of time that insecticides protected the pigs from lice reinfestation from their untreated dams was 6 days. This result is similar to the findings of other workers[16] who studied *H. eurysternus* infestation of cattle and reported that all lice were completely destroyed with 0.1 per cent to 0.25 per cent solution of Bayer L 13/59 (80%). They found that the residual effect lasted only a week.

The results of a single spraying of Bayer 21/199 (25%) and of Bayer L 13/59 (80%) applied to the eggs of *Haematopinus suis* are tabulated (tables 1 and 2). Concentrations of 0.25 per cent of Bayer 21/199 (25%) and Bayer L 13/59 (80%) have an ovicidal activity of 80 per cent and 86 per cent, and concentrations of 0.5 per cent have an ovicidal activity of 85 per cent and 94 per cent, respectively.

TABLE 1—Results of Single Spraying of Bayer 21/199 (25%) on Eggs of *Haematopinus suis*

Concentration (%)	Eggs incubated (No.)	Larvae recovered (No.)	Ovicidal activity (%)
0	100	79	...
0.25	100	16	80
0.50	100	12	85

TABLE 2—Results of Single Spraying of Bayer L 13/59 (80%) on Eggs of *Haematopinus suis*

Concentration (%)	Eggs incubated (No.)	Larvae recovered (No.)	Ovicidal activity (%)
0	100	79	...
0.25	100	11	86
0.50	100	5	94

Most of the larvae that hatched from eggs from the treated pig were weak and died in a few minutes. Some of the larvae apparently died while emerging from the shell. Others died in the egg. Dead embryos were seen in many of the unhatched eggs when such eggs were treated with lacto-phenol and examined under a microscope.

The effect of a single oral dose of Bayer 21/199 (25%) on the e.p.g. of *A. lumbricoides* is shown (fig. 1). Bayer 21/199 (25%) at 6.25 mg./kg. of body weight did not alter the parasitic load of the pigs. This finding is in accordance with the report of the USDA Agricultural Research Service[19] which states that Bayer 21/199 (25%) at 6.25 and 12.5 mg./kg. has no anthelmintic action on *A. lumbricoides*, *Ascarops strongylina*, and *Trichuris suis*.

The effect of administering single, oral, nontoxic doses of Bayer L 13/59 (80%) on the e.p.g of *A. lumbricoides* is shown (fig. 2). The e.p.g. of large roundworms was not reduced in pigs given 50.0 mg./kg.,

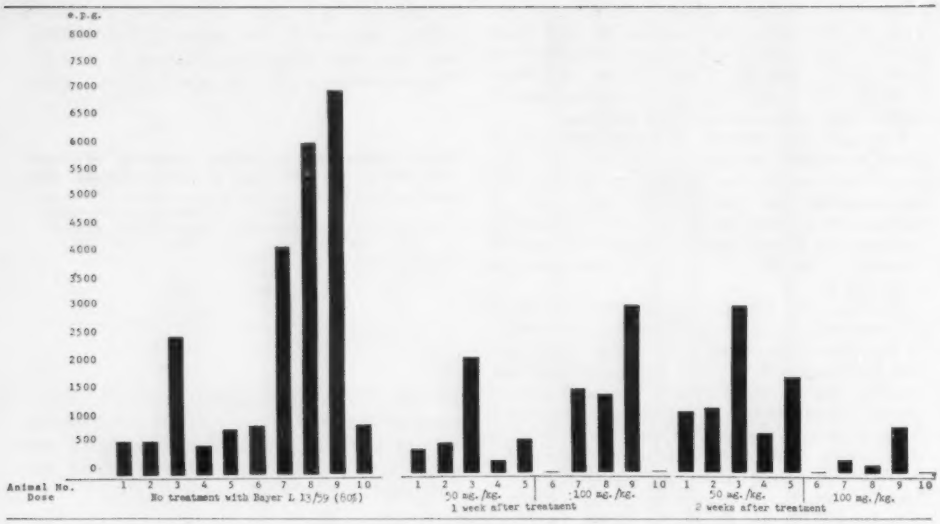

Fig. 2—Effect of single, oral, nontoxic doses of Bayer L 13/59 (80%) on e.p.g. of *Ascaris lumbricoides* of swine.

whereas the e.p.g. of the pigs given 100.0 mg./kg. was much reduced.

Bayer L 13/59 (80%) at 100.0 mg./kg. was effective in expelling the large roundworms. One day after treatment, large roundworms were passed with the feces and continued to be passed for 5 days. The worms that were expelled 4 to 5 days after medication were dark brown and soft, which indicated that they probably had been dead for some time.

In conjunction with this experiment, it was observed that Bayer 21/199 (25%) given orally at 6.25 mg./kg. to pigs had no effective insecticidal level as evidenced by the fact that the immature and mature lice on the pigs were not affected. This finding is supported by a report[4] that Bayer 21/199 (25%) given orally at 200 mg./kg. to rabbits did not kill the bedbugs which were allowed to suck blood from the experimental animals.

It was, however, observed that Bayer L 13/159 (80%), at the rate of 50.0 mg./kg. and 100.0 mg./kg. of body weight, effected an insecticidal blood level 2 to 3 hours after administration. The young lice were the more affected because of their continuous feeding habit. The adult lice were not killed for, during the time of insecticidal blood level, they were still running about on the hair of the pigs.

Summary

Bayer 21/199 (25%)—0, 0-Diethyl 0-(3-chloro-4-methyl-7-coumarinyl) phosphorothioate, and Bayer L 13/59 (80%)—0, 0-dimethyl-1-hydroxy-2, 2, 2-trichloroethylphosphonate, were evaluated as parasiticides in swine.

Bayer 21/199 (25%), applied as a spray in concentrations of 0.25 and 0.5 per cent, was effective against swine lice although the effect lasted only 6 days. It has an ovicidal activity of 80 to 85 per cent against *Haematopinus suis* and has no anthelmintic value on *Ascaris lumbricoides* at 6.25 mg./kg. of body weight.

Bayer L 13/59 (80%), administered externally as a spray in concentrations of 0.25 and 0.5 per cent, was highly effective against *H. suis*. Its effect lasted only 6 days. The insecticide has an ovicidal activity of 86 to 94 per cent against swine lice and, at 100 mg./kg. of body weight, was effective in expelling the large roundworms.

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Visceral Larva Migrans in Swine

Visceral larva migrans has been produced experimentally in pigs by oral administration of embryonated eggs of *Toxocara canis*.

Toxocara canis larvae migrate by the somatic route and are distributed throughout the body. Their presence in the brain and spinal cord is associated with nervous signs apparently provoked by the host reaction to static larvae rather than by the damage resulting from active migration. The distribution of larvae and the host reaction were determined 8 days after infective *T. canis* eggs were given.

In the pig, *Toxascaris leonina* larvae migrate transperitoneally and cause little tissue damage.—*Res. Vet. Sci., 1, (1960): 133; abstr. in Vet. Bull., 30, (Sept., 1960): item 2960.*

Prevalence of Bovine Mastitis

During Various Stages of Lactation

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W. D. POUNDEN, D.V.M., PH.D.

THIS REPORT correlates the occurrence of mastitis attacks in cows with the different stages of lactation and hormonal variations.

The relationship of mastitis attacks and estrous cycles has been mentioned by others.[2,8] Some legume forages have been reported to contain estrogenic substances.[10] The same forages, fed in the fresh state, were observed to be associated with the occurrence of numerous attacks of mastitis.[5-7] The microorganisms involved were stimulated by low concentrations of diethylstilbestrol,[4] concentrations that were slightly above those found in milk.[3] They were inhibited by higher concentrations.[4,9]

Methods

Records of the occurrence of mastitis and dates of parturition, breeding, and sometimes estrus were available for cows in 3 dairy herds, covering periods of 3 years for 2 herds and a single year for the other. All 3 herds had been established for many years, had good production records, and were maintained on highly productive farms. The vast majority of the mastitis-producing organisms encountered in these herds were staphylococci, streptococci other than *Streptococcus agalactiae*, and Pseudomonas sp. During winter months, the herds were fed grain, legume-grass hay, silage made from similar crops, and occasionally corn silage. In the summer, legume-grass forage crops were fed, but the feeding methods varied; some cows were fed fresh cut material, others grazed, and a few were fed similar forage as silage.

The attacks of mastitis were grouped according to the various stages of the lactation periods in which they occurred. In delineating the different stages, an attempt was made to reflect the different hormonal states likely to exist in the cows. The stages of lactation used were:

1) Parturition date to postpartum day 30.

2) From postpartum day 31 to postconception day 30.

3) From postconception day 31 to day 120 (4th month of pregnancy).

4) From fourth month of pregnancy to the end of lactation.

5) Dry period.

Attacks of mastitis that began each day within the period beginning 3 weeks prior to estrus and ending 3 weeks postestrus were also recorded.

Attacks were considered recurrent only when a period of at least 5 days had elapsed since the occurrence of a previous attack.

Results

There was a total of 509 attacks of obvious mastitis in the cows in the 3 herds (table 1). Mastitis attacks occurred relatively frequently in the first month after parturition (82 attacks). More than half (288) of the attacks occurred during the second period, from post-partum day 31 to postconception day 30, inclusive. Fewer attacks occurred after the cows were 1 month pregnant. There were 83 attacks in the next 3-month period, and 44 more in the remaining period up to the end of lactation. The total number of attacks for these 2 periods was 127.

The number of months cows in herd B were affected with mastitis during each stage of lactation, "mastitis cow-months," was compared with the total number of months in each stage, "total cow-months". Results are expressed in percentages (table 2). The proportions varied somewhat from year to year but, in general, the pattern was consistent. The percentage of "mastitis cow-months" in the period between a month postpartum and a month following the subsequent conception dates was 11.0 per cent. This is almost a 50 per cent increase over the 8.1 per cent for the next highest period,

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The authors thank Dr. C. R. Weaver, station statistician, for his assistance on the statistical analyses.

TABLE 1—The Prevalence of Attacks of Mastitis in Cows During Various Phases of Their Lactations

Herd	Year	No. cows affected	No. attacks	Parturition to 1 mo. postpartum	1 mo. postpartum to 1 mo. preg.	1 mo. preg. to 4 mo. preg.	4 mo. preg. to end	Dry period
A	1957	34	87	18	43	17	9	0
	1958	34	74	14	43	10	5	2
	1959	44	133	29	61	27	9	7
Total		112	294	61	147	54	23	9
B	1957	16	68	5	47	7	9	0
	1958	13	31	1	25	3	1	0
	1959	23	62	10	38	6	8	1
Total		52	161	16	110	16	18	1
C	1959	23	54	5	31	13	3	2
Grand total		187	509	82	288	83	44	12

the first month postpartum. These data also emphasized the tendency for attacks of mastitis to occur in the period between a month postpartum and a month after becoming pregnant again, in cows on certain forage crop rations, and when some of the mastitis-producing bacteria, particularly staphylococci and Pseudomonas sp., were present.

For the 3 herds, records were available on 140 attacks in 64 cow lactations that occurred on the day of estrus or within 21 days either pre- or postestrus, making a total of 43 days for this period. The number of attacks by weeks, beginning with the third week pre-estrus and ending with the third week postestrus, was 8, 12, 27, 33, 35, and 18, with an additional 7 attacks on the day of estrus. The weekly incidence also was calculated by including the 7 attacks that occurred on the day of estrus in each of the adjoining weeks and by eliminating a day at each end of the 43-day period to compensate. The weekly occurrence of attacks then became 11, 13, 34, 37, 33, and 20. As a result, the first week postestrus, rather than the second week, had the highest incidence of mastitis attacks. The highest incidence for any 7 consecutive days, however, was 39 for the period from the third to the ninth days postestrus.

The prevalence of attacks on each day of the 43-day period was fitted to a quadratic regression (fig. 1). The equation was $Y = 4.457 + 0.0652\ X - 0.0078X^2$ (Y = number of attacks, and X = day in the period under study). The quadratic regression was significant at the 1.0 per cent level. The maximum point in the curve was at 4.18 days postestrus, which correlates with the weekly incidence.

Discussion

More than half the attacks of mastitis occurred in the period beginning one month postpartum and ending when the cows were one month pregnant. This fact seems to indicate that there is some relation to es-

TABLE 2—The Summations for Each Stage of Lactation of the Number of Months for (1) Each Cow in the Herd (Total Cow-Months) and for (2) Each Cow Having Attacks of Mastitis (Mastitis Cow-Months)

Lactation stage		Year 1957	1958	1959	Total	Per cent
Fresh to 1 mo. fresh	Total cow-months	43	48	45	136	
	Mastitis cow-months	3	0	8	11	8.1
1 mo. fresh to 1 mo. preg.	Total cow-months	216	192	210	609	
	Mastitis cow-months	27	20	20	67	11.0
1 mo. preg. to end	Total cow-months	225	346	315	866	
	Mastitis cow-months	12	2	13	27	3.0
Dry	Total cow-months	28	62	44	134	
	Mastitis cow-months	0	0	0	0	0

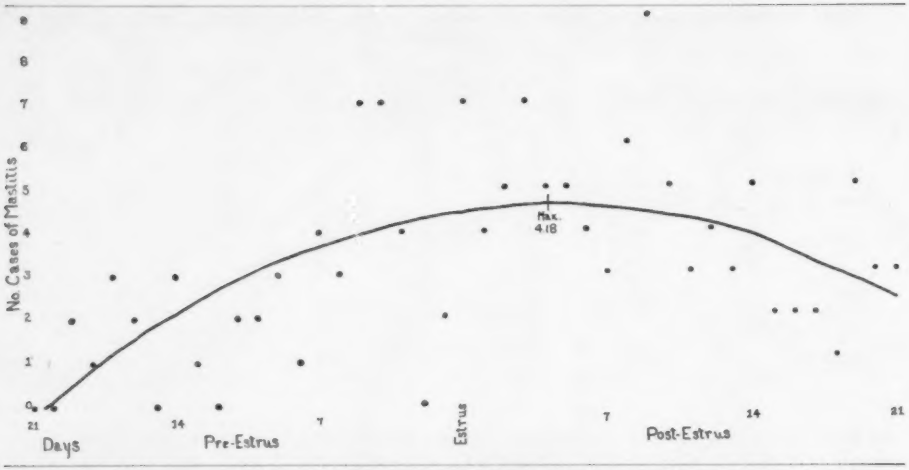

Fig. 1—The occurrence of mastitis attacks on each day of the 43-day period between 3 weeks pre-estrus and 3 weeks postestrus.

trus and estrogenic hormone levels in cows. The relationship is also supported by the observation that attacks were more prevalent between 3 and 9 days postestrus than in any 7-day period between 21 days pre-estrus and 21 days postestrus. The 3- to 9-day period covers the interval in the estrous cycle of cattle during which estrogenic activity is considered to be highest.[1] An alternative interpretation of the stimulus for mastitis attacks in the 3- to 9-day period would be to relate the increased progesterone concentrations resulting from developing corpora lutea. However, the progesterone relationship is less likely than the estrogenic one because small quanties of progesterone did not stimulate staphylococci.[4] Furthermore, part of the stimulus for the attacks, in all probability, came from the forage.[5-7] Evidence that progesterone is present in these forages has not been encountered.

Summary

More than half the 509 attacks of mastitis in 3 herds on legume forages occurred in the period from 31 days postpartum to the 30th day of the next pregnancy, inclusive. Within the first month postpartum, 82 attacks occurred, and 139 other attacks occurred during the rest of the lactation period or when the cows were dry.

The incidence of mastitis attacks during the period from 31 days postpartum to the 30th day of the next pregnancy was almost 50.0 per cent greater than it was during the next highest period (first month postpartum) based on the proportion of "mastitis cow-months" to "total cow-months" in one herd for which records were available.

Review of 140 mastitis attacks that occurred on the day of estrus or within 21 days either pre- or postestrus in 64 cow lactations indicated that the highest incidence of mastitis attacks for any 7 consecutive days was 39, and this occurred from 3 to 9 days postestrus. The prevalence of attacks on each day of this 43-day period was fitted to a quadratic regression. The maximum point in the curve, which represents the peak of occurrence, was at 4.18 days postestrus.

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An Anesthetic Mixture for Animals

An anesthetic mixture, consisting of 2 Gm. of chloral hydrate, 5 ml. of a 20 per cent solution of caffein and sodium benzoate, 0.1 ml. of a 1 per cent solution of lobeline hydrochloride, and 10 ml. of a 40 per cent solution of glucose, has given satisfactory results, according to veterinary investigators in Poland.

The following intravenous doses per kilogram of body weight were employed: sheep, 1.26 ml.; dogs, 1.3 ml.; rabbits, 2.2 ml. The mixture was well tolerated and the effects lasted longer than did those of chloral hydrate.—*Brit. Vet. J., 116, (1960): 99; abstr. in Vet. Bull., 30, (Sept., 1960): item 3041.*

Electrical Anesthesia

Surgeons at the University of Mississippi have used a 700-cycle electrical current to induce and maintain surgical anesthesia in dogs, monkeys, and human beings.

Following the usual preanesthetic medication, an airway tube is inserted, and the current applied by means of an oscillator, an amplifier, and electrodes applied to the patient's temples. The apparatus is said to cost about $150. Induction occurs within one minute; anesthesia persists as long as the current remains on; and recovery is complete within a minute, without nausea or other discomfort.—*Assoc. Press Release in Chicago Tribune, Jan. 15, 1961.*

Effect of Selenium on

White Muscle Disease in Lambs

A. LAGACÉ, D.V.M, Ph.D.

IT HAS recently been reported that selenium will prevent white muscle disease (WMD) in lambs.[2,4-6] Selenium was administered orally or parenterally to ewes during gestation or periodically to lambs the first few weeks of life.

Early in 1960, WMD occurred in lambs from a flock of ewes in Ohio. This report describes the use of selenium in these lambs in an effort to reduce morbidity and mortality. Serum glutamic-oxalacetic transaminase (SGO-T) concentrations in the bloodserums were used to evaluate treatment.[1,3,8] Clinical observations and necropsy findings were also recorded.

History

A flock of 175 lambs was allotted to 2 groups but housed in the same building. During the winter, the ewes were fed a mixture of home-grown alfalfa, timothy, and red clover hay. This hay appeared similar to that grown in previous years on the same fields. Prior hay crops had never caused severe manifestations of WMD.

There were no clinical signs of WMD until the first group of 120 lambs and their dams were turned out to pasture on April 10, when the lambs were about 8 weeks of age. Within 2 days, some lambs walked stiffly and several more were down and unable to rise. When observed for the first time, approximately 15 of the lambs had signs of the disease and 6 were unable to get up.

At this time, 1 mg. of sodium selenate was injected subcutaneously into each lamb; in addition 700 units of *alpha*-tocopherol were injected into the prostrate lambs and into 4 others with pronounced signs of WMD. Five lambs died and all others recovered.

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The author thanks Mr. Harold Scott for his assistance in this investigation.

In the second group of 55 lambs with their dams which were not yet on pasture, 1 lamb was down and 2 more walked with some stiffness. All lambs in the second group, excluding the 1 unable to get up, were ear-tagged and allotted to treated and untreated groups. Twenty-three lambs were used as controls throughout the experiment and were not given any treatment. Each of 31 lambs which served as principals was given 2 injections of 1 mg. of sodium selenate subcutaneously. The injections were given 10 days apart. The 2 stiff lambs were included in this group and were given, in addition, an injection of 700 units of *alpha*-tocopherol. Both groups were turned out at the same time on the same pasture 6 days after the first treatment.

None of the 31 selenium-treated lambs died or had signs of WMD and the 2 stiff lambs recovered without further complications. However, 2 of the control group died from WMD, and the diagnosis was confirmed by necropsy findings. Three others had severe stiffness of gait. In order to prevent futher economic loss, these were treated with *alpha*-tocopherol.

Laboratory Findings

Blood serum for SGO-T determination was collected from each of the 54 lambs on April 18, 21, 28, May 5, and 12. The technique for determining the SGO-T levels was similar to the one previously described.[7] The percentage of lambs from which SGO-T readings of over 1,000 Sigma-Frankel (SF) units were obtained[7] was tabulated for each serum collection (table 1). The fluctuation and mean concentrations of the SGO-T for both treated and untreated groups are presented (fig. 1). The SGO-T range in normal lambs is less than 200 SF units.[1] In lambs with signs of WMD, SGO-T readings ranged between 1,500 and 2,200 SF units.

Three days after the first selenium injec-

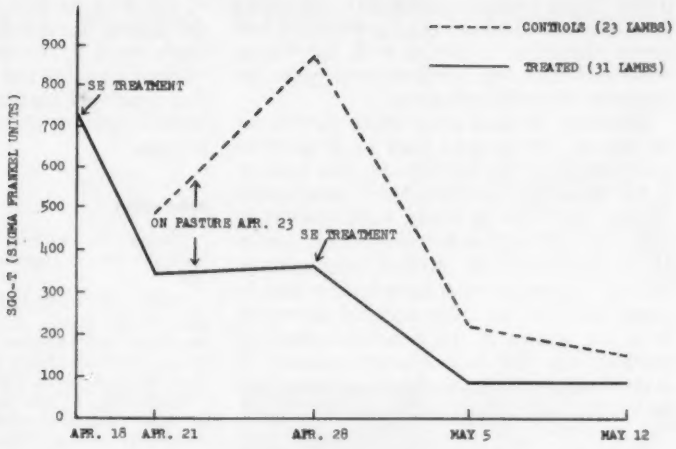

Fig. 1—Effect of selenium and pasture on the SGO-T mean concentrations in the blood of lambs with white muscle disease.

tion, the percentage of lambs from which SGO-T readings over 1,000 units were obtained declined from 25.8 per cent to 6.5 per cent (table 1); at the same time, readings of 1,000 units or higher were obtained from 13.0 per cent of the serums from the untreated group. A week later, serums from the treated group still yielded the same low percentage of SGO-T readings of more than 1,000 SF units, whereas the percentage from the untreated group increased to 39.1 (table 1). On the following serum collection dates, 12 and 17 days after the lambs were turned out on pasture, readings of more than 1,000 SF units were obtained from the serums of none of the treated lambs and only 4.8 per cent of the controls.

Ten days after the first selenium injection, the SGO-T mean concentration in the treated lambs had come down from a reading of 720 to 366 SF units, whereas the SGO-T mean concentration of the control lambs was at a high of 870 SF units (fig. 1). On May 5, 12 days after being turned out on pasture, the treated lambs had an SGO-T mean concentration of 84 SF units; the mean of the control lambs was 255 SF units. The last SGO-T determinations were made on May 12, 19 days after the lambs were turned out to pasture. A further drop in the SGO-T mean concentration in the controls to 155 units occurred while the SGO-T concentrations in the treated lambs remained at a low of 84 SF units. Thus, the trends of the SGO-T mean concentrations for both groups were downward after the lambs had been on pasture for several days.

Discussion

Blood serum determinations of SGO-T were not made on the large group that was turned to pasture early. The lack of controls plus the fact that they had already been turned out on pasture limited the evaluation of the treatment.

TABLE 1—Percentage of Lambs with Blood Serum Containing More Than 1,000 SGO-T Sigma-Frankel Units During an Outbreak of White Muscle Disease

Date	Controls (23 lambs) (%)	Selenium-treated (31 Lambs) (%)
4/18/60*	.....	25.8
4/21/60	13.0	6.5
4/28/60**	39.1	6.5
5/5/60†	4.8	0
5/12/60	4.8	0

*Day of first selenium treatment. **Day of second selenium treatment (5 days after being turned out on pasture). †12 days after being turned out on pasture.

As for the treated lambs used experimentally, it is evident that the first injection of selenium had rapid and beneficial results. In 3 days, SGO-T readings of over 1,000 SF units occurred in only 6.5 per cent of the lambs, whereas before treatment a similar level occurred in 25.8 per cent. Furthermore, 5 days after the lambs were put on pasture there was, in the treated animals, only a slight increase in SGO-T mean levels (from 343 to 366 SF units), whereas in the control lambs there was a steep elevation of their SGO-T mean level from 485 to 870 SF

units. These results indicate that increased exercise caused more muscle damage and SGO-T liberation in lambs with subclinical WMD and that the selenium treatment apparently afforded protection.

However, 12 days after being turned out on pasture, there was a striking drop in the SGO-T levels of the controls. At that time, or a few days later, normal SGO-T mean levels of less than 200 SF units were present in both controls and selenium-treated lambs. It is apparent that pasture accomplished for the control group what selenium had already done for the treated group. However, it is not known if the beneficial effect of pasture was due to its gross content in certain elements, like selenium, or other unrecognized nutritive requirements.

Summary

Sodium selenate, injected subcutaneously into lambs, was used in the control of white muscle disease in a flock of 175 lambs. The first clinical signs were observed in a group of 120 lambs when they were approximately 8 weeks old, 2 days after they had been turned out on pasture. Approximately 15 lambs were affected. Each lamb was given 1 mg. of sodium selenate subcutaneously and, in addition, *alpha*-tocopherol was injected into the most seriously affected lambs. Five lambs died but the disease was halted in the remainder of the flock.

Thirty-one of the remaining 55 lambs that were not yet on pasture, including 2 with stiffness, were treated with selenium, and the rest were used as controls. There was a rapid drop in the blood serum level of SGO-T in the treated lambs, and no clinical disease occurred. In the control group, there were 2 deaths out of 5 lambs with clinical signs of the disease. Several lambs had relatively high SGO-T blood levels which were indicative of subclinical white muscle disease.

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Transmission of Immunity to Tetanus from Ewe to Lamb

Ewes immunized against tetanus transmit to their lambs specific antibodies via colostrum in amounts that will assure full protection against infection in early life. Amount of protection transferred depends on the mother's titer at the time of parturition, the duration of acquired immunity, and the amount of antibodies received from the mother. Feeding lambs the first colostrum plays a vital part in antibody transfer.—*Vet. Rec., 72, (1960): 277; abstr. in Vet. Bull., 30, (Sept., 1960): item 2830.*

Experimental Feline Viral Rhinotracheitis

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J. R. GANAWAY, D.V.M., M.P.H.
F. D. MAURER, D.V.M., PH.D.

IN 1958, the isolation of a new virus from a cat which had clinical signs of a respiratory infection was reported.[2] The virus was isolated in cultures of feline renal cells and was associated with intranuclear inclusion bodies. The disease was reproduced and similar inclusion bodies were demonstrated in necropsy material from experimentally infected cats. Recently, "feline viral rhinotracheitis" (FVR) was proposed as the name for the disease entity caused by this newly recognized virus.[1]

It is the purpose of this report to describe the clinical signs and the pathologic findings in this disease in experimentally infected cats.

Fig. 1—Nasal discharge and salivation in a cat 72 hours following inoculation with feline viral rhinotracheitis virus.

Materials and Methods

Tissue Culture.—Primary feline renal cell cultures were prepared by the method of Madin.[3] The nutrient medium was 0.5 per cent lactalbumin hydrolysate in modified Hanks' balanced salt solution containing 0.01 M tris (hydroxymethyl aminomethane), adjusted to pH 7.4 and containing 10 per cent lamb serum. Maintenance medium was lactalbumin with 2 per cent lamb serum. Streptomycin (0.5 mg./ml.) and penicillin (500 u./ml.) were incorporated in all mediums.

Virus.—The virus used was infective tissue culture fluid prepared from the original FVR isolate. It was prepared by inoculating 32-oz. bottle cultures with 0.5 ml. of undiluted tissue culture fluid virus. Following 3 to 4 days of incubation at 37 C., the fluid was harvested and the cellular debris removed by centrifugation at 1,500 r.p.m. for 15 minutes. The inoculum possessed a t.c.i.d.$_{50}$ between $10^{-5.5}$ and $10^{-6.5}$/0.1 ml.

Experimental Animals.—Twenty domestic cats, 3 to 12 months old, were used. All cats were obtained locally from farms, and both sexes were represented. The cats were allowed to adjust to their new environment indoors for 2 weeks before inoculation. During this time, body temperatures and leukocyte counts were obtained, and the cats were observed for signs of illness. All body temperatures and leukocyte counts were considered to be within

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Dr. Crandell is a major, U.S.A.F., V.C.; Dr. Rehkemper, a major, U.S.A.F., V.C.; Dr. Niemann, a first lieutenant, U.S. Army, V.C.; Dr Ganaway, a captain, U.S.A.F., V.C.; and Dr. Maurer, a colonel, U.S. Army, V.C. Major Rehkemper is now at the Arctic Aeromedical Laboratory. Major Crandell is now at the 3790th Epidemiological Laboratory, Lackland AFB, Texas.

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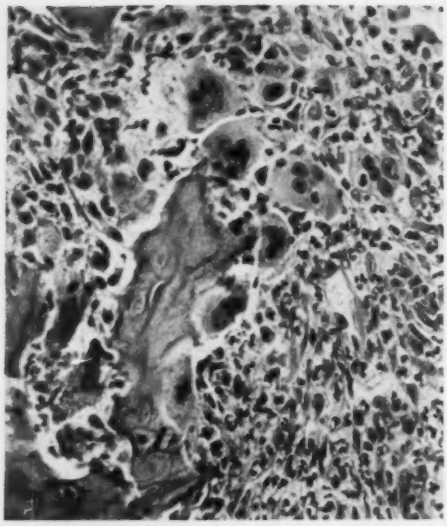


Fig. 2—Inflammatory reaction and osteoclastic activity around spicule of turbinate bone. H & E stain; x 350.

the normal limits, and the cats appeared healthy. During this observation period, several attempts to isolate the FVR virus from the nasal passages and throat failed. Blood samples were collected from all cats before and after inoculation.

Serum-Neutralization Tests.—Serial dilutions of serum that had been inactivated by heat at 56 C. for 30 minutes were prepared, with nutrient fluid as the diluent. An equal volume of virus suspension, diluted to contain approximately 1,000 tissue culture infective doses, was added to each dilution. The serum-virus mixtures were then incubated at room temperature for 1 hour. Following incubation, 0.1 ml. of each serum-virus mixture was inoculated into each of 3 feline kidney culture tubes. The tubes were incubated at 37 C., and daily observations for cytopathic changes (CPC) were made. The presence of neutralizing antibodies was indicated by the absence of cytopathic changes.

After 7 days of incubation, the highest serum dilution (final dilution after mixing with virus) that inhibited the CPC in 2 or more tubes was considered the antibody titer.

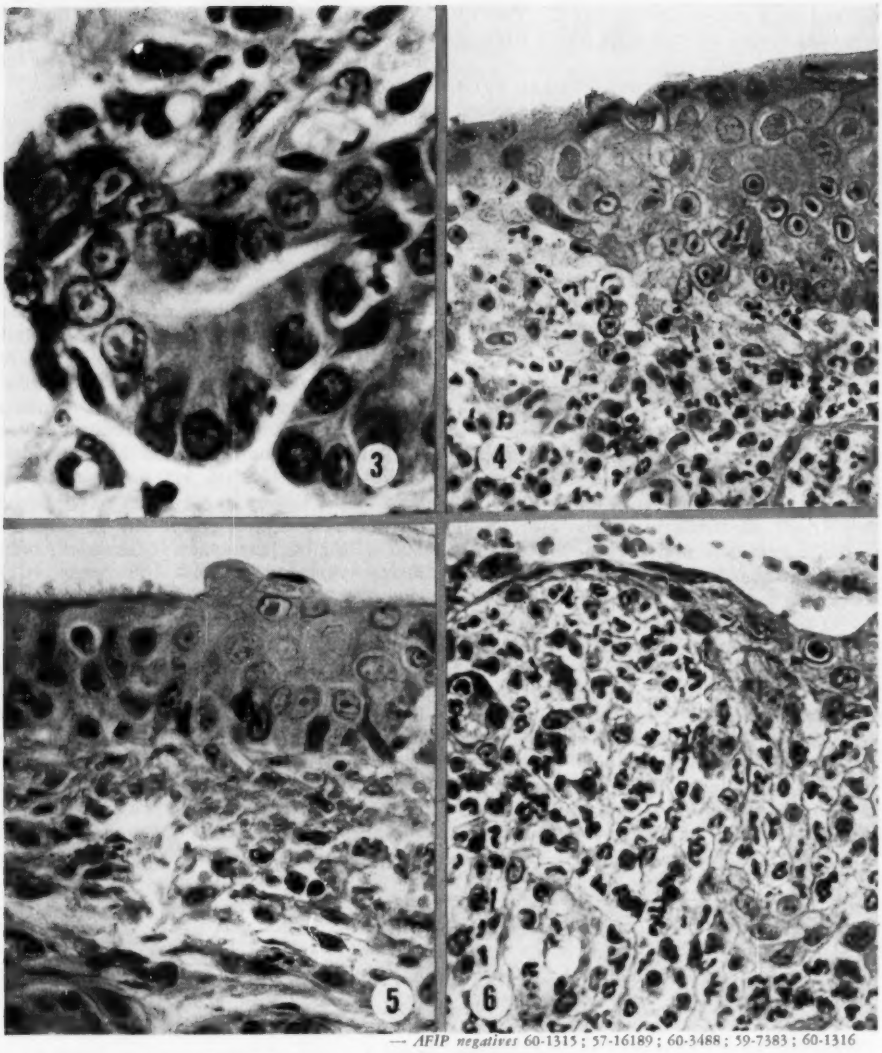
Animal Inoculation.—Twenty cats were allotted to 4 groups. Each test cat was inoculated with 0.25 to 0.5 ml. of undiluted virus administered intranasally while under pentobarbital sodium anesthesia. The cats in group 1 were inoculated with virus from the third tissue culture passage; group 2, the fourth; and group 3, the sixth passage. Cats in the fourth group were isolated in another room to serve as uninoculated controls. Clinical observations were made daily. Temperatures and white blood cell counts were recorded daily for at least 10 days after inoculation. In test group 2, the red blood cell counts were recorded daily. Cats were euthanatized on the second, third, fourth, fifth, and sixth days for pathologic studies. These cats were euthanatized by a lethal dose of pentobarbital sodium given intraperitoneally. A complete necropsy was performed immediately after death. Representative tissues of all organs were fixed in Bouin's fluid, and hematoxylin and eosin sections were prepared by routine histologic methods.

Bacteriologic Studies.—Blood and throat swabs were obtained from cats at 48 and 72 hours following inoculation. These specimens were inoculated into thioglycolate broth and streaked on blood agar plates. Identification of the organisms was made by standard bacteriologic methods.

Virus Recovery.—The isolations were made by swabbing the nasopharyngeal region and conjunctiva with a sterile cotton swab, which was then placed in a feline renal culture tube and incubated at 37 C. for approximately 2 hours. The monolayer culture was rinsed twice and new medium added. Daily observations were made for the presence of cytopathic changes in the monolayer.

Results

The clinical response is summarized (fig. 7). Although there was no marked difference among the groups of inoculated cats, individual responses were evident. The onset of the disease was marked by a slight elevation of temperature on postinoculation (PI) day 2, accompanied by sneezing, salivation, and a leukocytosis. By PI day 3 the average temperature was 104 F. or slightly higher. At this time, the cats were depressed. Profuse lacrimation and nasal discharges were accompanied by mouth breathing and paroxysms of sneezing and coughing. A constant and persistent observation was soiling of the forepaws, a result of the wiping motion in order to free the face from exudate (fig. 1). Between PI days 3 and 6, the cats began to be inappetent, and coughing increased. There was conjunctivitis, which increased in severity through PI day 5. By PI day 6 the ocular and nasal discharge had become mucopurulent. The temperature continued to rise and reached a peak by PI day 5. Although the average white blood cell count was 38,000 on PI day 3, the count for 1 cat increased to 98,000. The w.b.c. counts had returned to normal limits by PI day 14. At no time was a leukopenia demonstrated. In the cats of 1 group in which red blood cell counts were taken daily, there was no apparent alteration in the count. Five cats died between PI days 16 and 30.



— *AFIP negatives* 60-1315 ; 57-16189 ; 60-3488 ; 59-7383 ; 60-1316

Fig. 3—Intranuclear inclusion bodies in ductal epithelium of glands in turbinate. H & E stain; x 1,190.

Fig. 4—Intranuclear inclusion bodies in epithelial cells of tonsils 3 days postinoculation. H & E stain; x 400.

Fig. 5—Intranuclear inclusion bodies in epithelial cells of trachea at PI day 3. H & E stain; x 530.

Fig. 6—Nictitating membrane of cat at PI day 5 has epithelial erosion, inclusion bodies, and infiltrating neutrophils. H & E stain; x 530.

Both preinoculation and postinoculation serums from the experimental cats were tested for specific neutralizing antibodies. All preinoculation serums failed to prevent cytopathic changes. No neutralizing antibody was demonstrated in the postinoculation serums from the cats euthanatized on PI days 2 to 6. The earliest response was

observed on postinoculation day 21. Two of the 8 cats tested on PI day 24 had a titer of 1:4.

Pasteurella multocida and *beta*-hemolytic streptococci were isolated from the blood of 2 cats tested on PI days 2 and 3. In addition to these 2 organisms, *alpha*-hemolytic streptococci were isolated from the throat of these 2 cats.

Virus was recovered from the nasopharyngeal region and conjunctiva during the early course of the disease. Generally, the virus was not isolated later than 2 weeks following inoculation. However, in one instance it was isolated on PI day 50.

Gross Pathology

Externally there were crusts about the eyes and external nares. The most significant lesions were found in the upper respiratory tract, particularly in the mucosa of the nasal passages and turbinates. An initial mild congestion of the mucosa, accompanied by a serous exudate, was followed in 3 to 6 days by the gross appearance of focal necrosis and a mucoid to mucopurulent exudate.

Mild inflammation was present in the larynx and trachea. The tonsils were enlarged, and a few petechiae appeared on PI day 4. The cervical lymph nodes were somewhat enlarged and by day 6 a few petechiae were present. The mediastinal and bronchial nodes were slightly congested and prominent.

The most common findings in the cats that died between PI days 16 and 30 were loss in weight, dehydration, and the absence of subcutaneous fat.

Histopathology

The characteristic cytologic feature was the occurrence of intranuclear inclusion bodies in the epithelium of the upper respiratory tract.

In affected cells, there were changes similar to those reported in infected feline renal cell cultures.[1] There was fragmentation of the nucleolus with stippling of the basophilic nuclear chromatin. These basophilic particles marginated, leaving a central area of homogeneous nuclear material. This homogeneous material became acidophilic and contracted, leaving a clear halo around the spherical inclusion. Well-formed inclusions occupied from one third to one half of the nuclear space. The nuclear membrane remained intact but was often shrunken.

Degenerative changes in the cytoplasm usually accompanied the nuclear alterations. The cytoplasm became pale, later forming a clear zone around 1 side of the nucleus. Occasionally, it became ballooned, granular, and necrotic, losing its distinct outline, and the superficial mucosa subsequently became disrupted. When this occurred, localized infiltration of polymorphonuclear cells, with submucosal congestion and edema, sometimes resulted.

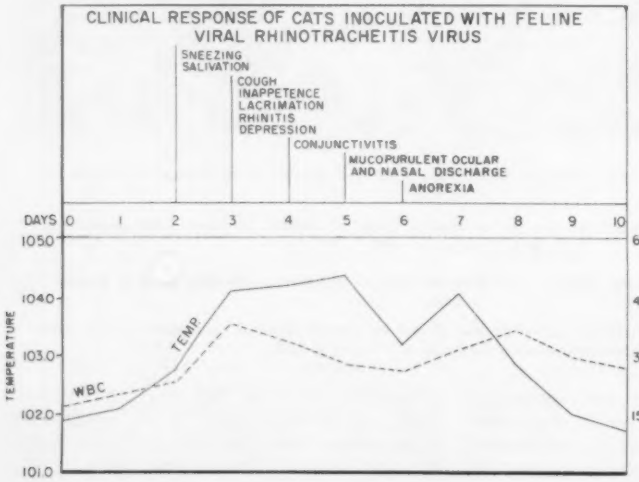


Fig. 7—Average body temperatures and white blood cell counts of 16 cats, 6 of which were euthanatized periodically starting on postinoculation day 2.

Nasal Septum, Turbinates, and Nasopharyngeal Region.—On PI day 2, there were numerous inclusion bodies in the mucosal epithelium, with a few present on day 5. On examination of tissues on day 17, there were several inclusions in association with local areas of intense inflammatory reaction. Fibrin with an admixture of neutrophils was present in the nasal passages on PI day 2, developing into a persistent severe mucopurulent exudate by the following day. Pyknotic cell debris, with lymphocytic and macrophagic infiltration, were found at this time and persisted as long as 17 days. On PI day 2, erosion of the epithelium occurred with ulceration; later, the epithelium became severely necrotic. This condition persisted throughout most of the disease. Some squamous metaplasia and epithelial regeneration were seen on PI day 17. By the 26th day, considerable regeneration and hypertrophy of the epithelium had occurred.

Neutrophils were present in the epithelium on day 2 and became more numerous during the next few days. Following a decrease, they then appeared in considerable numbers by PI day 17. Lymphocytes appeared on day 4 and were relatively numerous as late as day 17, with a few present at day 26.

The lamina propria was intensely infiltrated with neutrophils on day 2, with lymphocytes also appearing here on day 4. At this time, the lamina propria became thickened, and this was accompanied by the appearance of fibrin and macrophages.

There was resorption of the turbinate bone as early as day 4, with many osteoclasts aligned along remnants of osseous tissue (fig. 2). Intranuclear inclusions were observed in the ductal epithelium of the glands on day 2 (fig. 3).

Tonsils.—Numerous intranuclear inclusions were demonstrated in the stratified squamous epithelium of the tonsils from PI days 2 to 5 (fig. 4). The tonsillar epithelium was infiltrated with neutrophils and had become ulcerated as early as day 2. The tunica propria and adjacent muscle were rather intensely involved between days 4 and 6. The adjacent posterior pharyngeal region was similarly involved, and a few inclusion bodies were present in the epithelium.

Epiglottis.—The epithelial cells contained some inclusions, with a polymorphonuclear infiltrate and ulceration occurring on PI day 4. These changes were accompanied by a mild, acute, subepithelial infiltrate, which was most marked in the laryngeal mucosa.

Trachea.—An exudate containing blood, fibrin, and polymorphonuclear leukocytes was present within the lumen between PI days 3 and 5. Intranuclear inclusions were found in the luminal epithelial cells on days 2 and 3 (fig. 5). Erosion of the mucosal epithelium was present on day 3, becoming less noticeable by day 5, at which time regeneration and hypertrophy were first seen. Goblet cells were conspicuous, especially on days 3 and 4. During this time and extending through day 6, a submucosal cellular infiltrate of neutrophils and lymphocytes was prominent. The submucosal glands were hypertrophied, and a few foci of lymphocytes were present in the wall of the trachea.

Nictitating Membrane.—Numerous distinct intranuclear inclusions were present in the stratified squamous epithelium of the conjunctiva on PI day 2, with fewer present on day 5 (fig. 6). There was moderate epithelial erosion evident at day 3. Although some areas of the mucosal epithelium were thinned, others were hypertrophied. Neutrophils appeared in the epithelium on day 3, becoming more numerous on days 5 and 6. Lymphocytes appeared on day 4. An intense, acute, neutrophilic infiltrate occurred in the lamina propria on day 3, with lymphocytes and macrophages appearing later. In the bulbar epithelium, there were a few inclusions between days 3 and 5, with moderately severe focal epithelial erosion by day 6.

Liver.—There was evidence of an acute septicemia of short duration. Later in the course of the disease (PI days 17 to 30), the hepatic cells were shrunken, with cloudy swelling and some loss of cell outline. The absence of glycogen was most noticeable at this later time.

Other Tissue.—Lesions in other tissues were not significant and were considered secondary in nature.

Discussion

The results reported here clearly indicate the FVR virus can be readily transmitted to susceptible cats by intranasal inoculation. The clinical signs manifested were similar to those observed by us in natural

occurrences of the disease. The disease, however, was more severe and acute than that seen under natural conditions. The salient clinical features of the disease were conjunctivitis with lacrimation, rhinitis accompanied by coughing and sneezing, and salivation. Generally, the experimental disease was followed by recovery in 2 weeks. However, some cats refused to eat during the third week of the disease at a time when they appeared to be recovering, and 5 died by PI day 30. No additional changes other than extreme emaciation were found in these cats.

The early rise in body temperature, sneezing, and salivation were attributed to the infection of the cells by the virus. It was at this time that intranuclear inclusion bodies were found in the epithelial cells of the upper respiratory tract, unaccompanied by an inflammatory reaction. The presence of inclusion bodies was indicative of the primary site of injury with the virus. Later, however, bacteria invaded the epithelial cells when a break occurred in the mucosal surface, and an inflammatory process ensued. The subsequent rises in body temperature and high w.b.c. counts were attributed to this secondary bacterial infection.

Other signs of illness, such as anorexia and depression, were generally mild but varied from cat to cat.

The characteristic feature of the histopathologic findings was the occurrence of the intranuclear inclusion bodies during the early course of the disease. The inclusion bodies were present in the epithelial cells of the upper respiratory tract, posterior pharyngeal region, and in the conjunctiva of the nictitating membrane. Inclusion bodies have also been observed in necropsy material from cats with natural infection. We believe the demonstration of inclusion bodies was helpful in making a specific diagnosis. The presence of intranuclear inclusion bodies and the absence of pneumonitis aided in differentiating FVR from feline pneumonitis.

The immune response measured by serum-neutralization tests was of low magnitude. As early as 1 month following initial exposure to the virus, the cats had a slight clinical response when challenged with this virus. This apparent lack of immunity and persistence of the virus in the upper respiratory tracts of cats may explain why this disease frequently recurs in cat colonies.

Summary

Feline viral rhinotracheitis in experimentally infected cats is characterized by its sudden onset, conjunctivitis, lacrimation, and nasal discharge accompanied by coughing and sneezing. The characteristic histologic feature was the demonstrable intranuclear inclusion bodies in the epithelial cells of the upper respiratory tract, tonsils, and nictitating membranes.

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Canine Emphysematous Cystitis Uncommon

In emphysematous cystitis in dogs, accumulation of gas due to gas-producing bacteria may be found in the wall of the bladder. In rare instances, radiologic diagnosis of the disease can be made. Among 800 Austrian dogs examined radiologically during a 5-year period, only 8 cases of emphysematous cystitis were found.—*Wien. tierärztl. Monatschr. (Aug., 1960): 529.*

Susceptibility of Cats to Phenol

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GENERATIONS OF students in veterinary medicine have been taught that phenol or cresol derivatives, used externally or internally, are especially dangerous to cats. Apparently this opinion persists to the present day.

Some texts[2] warn against the use of any preparation of tar, cresol, or phenol for treatment of mange in cats, stressing that this may be followed by severe or fatal respiratory complications. Exposure to German coal-tar wood preservative is reported to cause alopecia in cats and conjunctivitis in kittens.[8] Phenol has been incriminated frequently because of its toxic effects in cats.[1,3-5,7]

In one study, young adult cats were given 3 to 5 ml. of phenolized rabies vaccine (20% brain tissue, caprine origin, containing 0.5% phenol) subcutaneously and no ill effects were observed.[6] Despite this report the belief that phenol-containing biological products are contraindicated in cats still persists.

Our studies were intended to obtain information on the toxicity of phenol when administered by hypodermic injection in cats.

Methods and Materials

A total of 21 adult cats, averaging 9 lb. in weight, were used in the experiment. These were allotted to 2 groups. Cats in group 1 were given phenol intravenously; cats in group 2 were given phenol subcutaneously. In all trials, a 0.5 per cent solution of phenol in 0.9 per cent sodium chloride solution was used.

Eleven cats were given phenol intravenously. Following injection of phenol, they were carefully observed for one-half hour or until the disappearance of toxic signs, whichever was longer. They were then returned to their cages and observed every half hour for 3 hours and again the following morning. During the observation period, pulse and respiration rates and body temperatures were recorded. The following doses of phenol were given intravenously: 5, 10, 20, 40, 60, 70, and 80 mg.

Ten cats were given phenol subcutaneously. Two cats were given 5 mg. daily for 5 days; 3 were given 30 mg. daily for 3 days; and the remaining were given single doses of 20, 40, or 60 mg. The cats were observed 4 hours after administration of phenol, and in those trials in which repeated injections were given, observations were made 3 times daily for 3 days and then twice daily for the next 2 days.

Necropsies were conducted on all cats that died during the experiment. Surviving cats were euthanatized at the conclusion of the experiment.

Results

Intravenous Injection (Table 1).—Doses of 5 to 10 mg. of phenol resulted in little change except for increasing respiratory rates.

Beginning immediately after injection of phenol, these signs were observed in 1 cat which was given 20 mg.: twitching of eyelids and facial muscles, frequent head shaking, slight ataxia, dilation of pupils, and a change in voice to a harsh character. These signs subsided in 3 minutes.

Doses of 40 mg. produced signs similar to those seen when 20 mg. was given with the exception that both cats had increased pulse rate. One cat became vicious when handled. Both appeared normal in 18 to 25 minutes.

Two cats given 60 mg. of phenol had clonic convulsions beginning immediately after completion of the injection. Convulsions subsided within 2 minutes, but the cats could not stand for 5 to 13 minutes. While recumbent, there was marked saliva-

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This study was supported in part by a grant from Wyeth Laboratories, Philadelphia, Pa.

TABLE I—Results of Intravenous Injection of Phenol into Cats

Cat No.	Dose	Head shaking	Respir. rate change	Pulse rate change	Facial twitching	Ataxia	Convulsions	Death
1	5 mg.	—	55-60 (5)	140-200 (60)	—	—	—	—
2	10 mg.	—	60-60 (0)	140-140 (0)	—	—	—	—
3	20 mg.	+	55-80 (25)	140-168 (28)	+	+	—	—
4	40 mg.	—	24-32 (8)	140-240 (100)	+	+	—	—
5	55-60 mg.	+	48-40 (−8)	120-160 (40)	+	+	—	—
6	60 mg.	+	48-80 (32)	140-250 (110)	+	+	+	—
7	70 mg.	+	80-120 (40)	150-250 (100)	+	+	+	—
7A	70 mg.	+	.....*	140-250 (100)	+	+	+	—
8	80 mg.	—	80-0 (−80)	140-0 (−140)	—	—	+	+
8A	80 mg.	+	60-60 (0)	140-180 (40)	+	+	+	—

*Not able to obtain because of convulsions.

tion and violent head-shaking in both. On standing, they were ataxic and had dilation of pupils, twitching of facial muscles and eyelids, tachycardia, and increased respiratory rate. After 28 minutes they appeared normal.

Signs similar to those seen with the 60-mg. dose were observed in 2 cats given 70 mg. of phenol. Convulsions subsided within 2 to 5 minutes and in 16 minutes both appeared normal.

One cat, given 80 mg. of phenol, died 5 minutes after it had violent convulsions, plus the other signs observed in cats given doses of 60 and 70 mg. A second cat which was given 80 mg. had similar signs, but it survived.

Subcutaneous Injection (Table 2).—In 2 cats given a daily dose of 5 mg. of phenol for 5 consecutive days, there were no signs of toxicosis with the exception of inappetence.

TABLE 2—Results of Subcutaneous Injection of Phenol into Cats

Cat No.	Dose	Toxic signs	Pulse rate change	Temperature (F.)	Appetite
1A	5 mg. daily for 5 days (total of 25 mg.)	—	140-180 (40)	101.0-102.8 (1.8)	Poor
1B	5 mg. daily for 5 days (total of 25 mg.)	—	140-160 (20)	99.8-103.0 (3.2)	Poor
2A	20 mg.	—	140-180 (40)	101.3-106.5 (5.2)	Fair
3A	40 mg.	—	160-208 (48)	100.8-102.2 (1.4)	Good
3B	40 mg.	—	150-176 (26)	102.6-105.8 (3.2)	Good
4A	60 mg.	—	120-172 (52)	99.6-102.0 (2.4)	Good
4B	60 mg.	—	140-160 (20)	100.4-103.8 (3.4)	Good up to day 5
5B	60 mg.	—	100-100 (1)	102.3-99.8* (2.5)	Good
5A	30 mg. daily for 3 days (total of 90 mg.)	No righting reflex on day 5	120-192	104.4-94.0* Died on day 5	Good to none
2B	30 mg. daily for 3 days (total of 90 mg.)	Diarrhea on day 2	140-160 (20)	102.8-99.0* (−3.11)	Good

*Recorded lowest temperature on day 5; — (minus sign) = negative.

Three cats were given 30 mg. of phenol daily for 3 days. Two days after the last injection, 1 cat died following development of diarrhea, loss of righting reflex, and twitching of forelimb muscles. The 2 other cats survived but were inappetent and had diarrhea.

Cats which were given single doses of 20, 40, and 60 mg. of phenol were inappetent and had diarrhea, but survived.

On necropsy and histopathologic examination of cats that died during experiments, specific pathologic changes were not found.

Summary and Conclusions

Twenty-one cats, averaging 9 lb. in weight, were given intravenous and subcutaneous doses of phenol in a 0.5 per cent solution.

Intravenous doses of 20 to 70 mg. caused increased respiratory rates and convulsions; 80 mg. appeared to be the lethal dose.

Single subcutaneous doses up to 60 mg. induced transient inappetence and diarrhea. Three consecutive daily doses of 30 mg. caused death in 1 of 3 cats.

The intravenous toxic dose of phenol for cats ranges from approximately 2.2 to 7.7 mg./lb. of body weight. The lethal dose approximates 8.8 mg./lb. of body weight.

Reliable information on the toxic doses of phenol by hypodermic injection in various species of animals is lacking. However, it appears that the presupposed toxicity of phenol for cats may be related to this species' habit of licking the medicated body surface rather than to unusual drug sensitivity.

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Cecal Enlargement in Germ-Free Animals

One of the major difficulties confronting investigators of germ-free animal production is the development of an enlarged cecum in all species of animals successfully raised in a germ-free state.

Germ-free animals have cecums which, with their contents, weigh about 6 times that of conventional animals. In germ-free rabbits, the cecum and its contents may sometimes represent one third of the body weight. This enlarged cecum sometimes gets twisted, thus preventing cecal flow and causing death. It has been theorized that the enlarged cecums in the germ-free animals are due to the absence of bacterial products and to nutritional deficiency.—*Nutr. Rev., 18, (Oct., 1960): 313.*

Use of the

Portocaval Shunt in the Treatment of Ascites

in a Dog

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IN OUR PRACTICE, dogs with ascites are usually given a poor prognosis. Treatment consists of abdominal paracentesis, administration of diuretics, and attempts at dietary control—feeding high carbohydrate and low protein foods. Since ascites usually arises late in the course of disease, these treatments are often of little help.

There are many causes of ascites, such as visceral neoplasms, migrating parasites, toxoplasmosis, and hepatic cirrhosis. However, in our experience, ascites most commonly appears to be due to a chronic defect in a valve or valves of the heart. This defect results in increased blood pressure in the vena cava and portal system. Chronic passive congestion occurs and eventually causes damage to the liver and kidneys.

Case Report

A 9-year-old male Beagle dog weighing 26 lb. was admitted to the hospital because of an ascitic condition. The dog had been given routine therapy for more than a year, including vitamins and a mild diuretic which contained sparteine, digitalis, and strophanthin. The dog had a heart murmur and was suspected of having chronic kidney damage. On examination in April, 1960, there was pronounced shortness of breath, coughing, weakness, and abdominal distention due to gradual accumulation of fluid. By paracentesis, about 2,000 cc. of fluid was removed. A transfusion of 250 cc. of whole blood was given. Acetazolamide,* 125 mg. daily, was prescribed. The ascitic condition seemed to improve temporarily, but within 2 weeks the ascitic fluid had again accumulated. Besides, the dog did not tolerate the acetazolamide well. Paracentesis was performed again and digitalis therapy was resumed. Two weeks later, the dog was weaker than ever.

We decided to employ the von Eck[9] fistula or portocaval shunt technique. Although success of this operation has been demonstrated in man on various occasions, the technique is not known to have been employed by a practicing veterinary surgeon before. The portocaval shunt technique of von Eck has been shown by several investigators to be a means of giving relief to ascitic distention. It has been reported that rate of ascitic fluid production falls if capillary pressure in the portal system is decreased. Ascitic fluid production is also aided if the dog is kept on a diet of milk biscuits and corn syrup.[21]

Surgical Technique of the Portocaval Shunt

Pentobarbital sodium anesthesia was administered. The patient's trachea was immediately intubated, and a closed-circuit artificial respiration system was engaged using 96% oxygen.

The primary incision was made from the xiphoid cartilage obliquely and caudad across the upper right quadrant of the abdomen and extending into the lower right quadrant. The incision was held open with a Babcock retractor. The posterior vena cava was fully exposed cranial to the right renal vein. The portal vein was found to be too far forward and too short to conveniently perform a side-to-side anastomosis with the

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*Diamox, American Cyanamid Co., Pearl River, N.Y.

vena cava. Therefore, the common mesenteric vein was chosen for the anastomosis instead. Due to the severe portal hypertension, both the common mesenteric and the splenic veins, which unite to form the portal vein, were greatly enlarged and thus easy to manipulate.

In performing a side-to-side anastomosis, a Potts clamp was employed to cut off the blood supply to that area of the vena cava to be exised. At the same time, it allowed a bypass flow of venous blood back to the heart (Fig. 1). Bulldog clamps were attached to the splenic vein close to its union with the common mesenteric vein and to the portal vein just cranial to its junction with the splenic vein. This technique prevented a back-flow from the liver. A third clamp was placed on the common mesenteric vein caudad to the region to be incised. The only passage of venous blood through this area was confined to that section of the vena cava not cut off by the Potts clamp (Fig. 1).

An elliptical section of the wall of the vena cava, about ½ inch long and ⅛ inch wide, was exised. The elliptical shape of the excision retards postoperative closure of the anastomosis. A slit was made in the adjacent wall of the common mesenteric vein slightly longer than the elliptical resection in the vena cava. The anastomosis was performed using 2 continuous No. 4-0 silk sutures with needles attached (Fig.2-6). On release of all clamps, leakage occurred at the anastomosis but subsided in a few minutes. Engorgement of the common mesenteric, splenic, and portal veins was almost immediately reduced. Abdominal closure was performed in a routine manner.

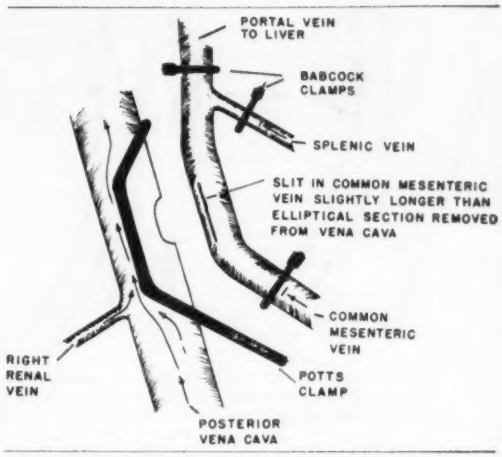
PORTAL VEIN TO LIVER
BABCOCK CLAMPS
SPLENIC VEIN
SLIT IN COMMON MESENTERIC VEIN SLIGHTLY LONGER THAN ELLIPTICAL SECTION REMOVED FROM VENA CAVA
COMMON MESENTERIC VEIN
RIGHT RENAL VEIN
POTTS CLAMP
POSTERIOR VENA CAVA

Fig. 1—Vena cava and portal vein are in apposition with Potts and Babcock clamps in place.

Postoperative Care

During and immediately after the portocaval shunt operation, the dog was given 400 cc. of 5% glucose in water, intravenously. Recovery from anesthesia was uncomplicated. A high-carbohydrate, low-protein diet was instituted.

On the following day, the dog's body temperature increased to 102.4 F., and 100 cc. of 20% glucose in water was given intravenously. The dog was fed jellies and jams and given no proteins for 5 days. Digitalis, fluid therapy, and protein-free diet were maintained for 7 days. There was no evidence of abdominal fluid accumulation, but coughing persisted. The cough was believed to be related to the passive congestion in the lungs caused by inadequate valve closure in the heart.

On postsurgical day 7, blood and urine samples were collected for analysis. Hemoglobin was 9.98 mg./100 cc., packed cell volume was 27.5%, red blood cell count was 3,940,000, white blood cell count was 41,000, and polymorphonuclear leukocytes comprised 91% of white blood cells, lymphocytes 3%, monocytes 3%, and eosinophils 2%. Blood nonprotein nitrogen was 92 mg./100 cc.

The pH of the urine was 8, and there

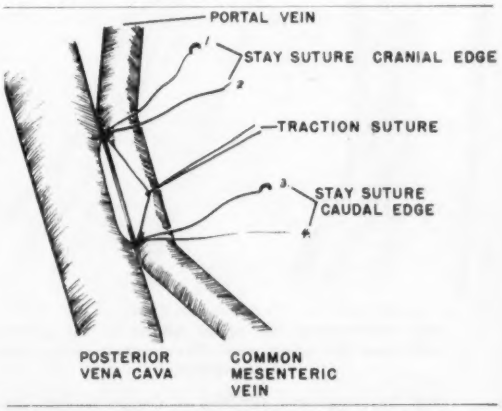

Fig. 2—Stay sutures and traction suture in place.

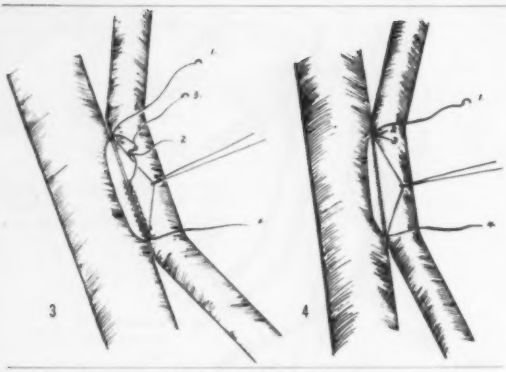

Fig. 3—Suturing of lower edges of portal vein and vena cava. Over-and-over continuous suture is used and is completed by tying to stay suture at cranial end.

Fig. 4—Lower edge of portal vein and vena cava are united

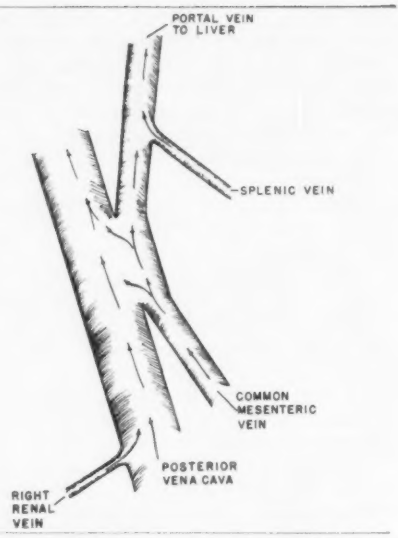

Fig. 7—Completed portocaval shunt with anastomosis complete and functioning; partal hypertension is relieved.

were present albumin (2+), white blood cells, red blood cells, and amorphous debris.

The blood and urine findings indicated an anemic condition, accompanied by leukocytosis and a high nonprotein nitrogen. The latter probably was due to chronic nephritis. Antibiotic and anti-anemia therapy were instituted.

There was tenesmus, and the dog passed small, soft stools. The severity of the tenesmus almost caused a perineal hernia. On palpation of the abdomen, a mass, measuring about 3 by 3 by 2 inches, anterior to the pelvic area and in the region of the bladder and prostate was found. On catheterization, there was no urethral blockage. A sedative was given to alleviate the tenesmus. The following day, the mass receded somewhat, and the dog was given estradiol cyclopentylpropionate, 1 cc., intramuscularly. Over a period of 3 days, the spherical mass gradually diminished in size until it was only 2 inches in diameter. The mass was tentatively diagnosed as an enlarged prostate gland. Three days later, the dog was discharged from the hospital.

Home treatment consisted of digitalis therapy, vitamin therapy including vitamin E and liver and iron concentrate, and a low-protein diet. On examination 3 days later, the dog was in good condition. The owner reported that the dog had done little coughing. The abdomen appeared entirely normal. The mass, considered to be a prostatic enlargement, had decreased in size. The dog urinated normally and had normal bowel functions.

At the time of reporting this case, 2½ months had elapsed. The dog was fairly comfortable and only experienced distress occasionally, presumably because of the faulty cardiac valve closure. Ascites still

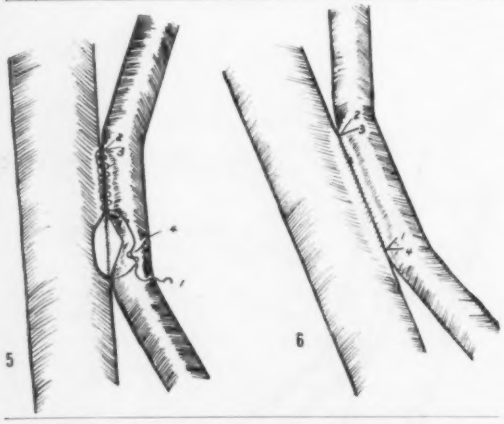

Fig. 5—Suturing the upper edges of the portal vein and the vena cava. The traction suture has been removed.

Fig. 6—Completed suturing of the portocaval anastamosis. At this point, the clamps are removed.

recurrred when meat or meat by-products formed too large a portion of the dog's diet.

Summary

Ascites in a 9-year-old male Beagle, which did not respond to routine therapy of diet restriction, diuretics, and digitalization, was aided by a surgical treatment involving a portocaval shunt.

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Chronic Arteritis

in the Laboratory Rat

Bernard H. SKOLD, D.V.M., M.S.

A SYSTEMIC ARTERIAL DISEASE, characterized by the formation of multiple, discrete inflammatory lesions and referred to as chronic arteritis, was mentioned in 47 of 108 laboratory rat necropsy reports reviewed at the Armed Forces Institute of Pathology. The rats had been used in a feeding study conducted with irradiated and nonirradiated food. Of the 47 rats with lesions of chronic arteritis, 16 were in the control group fed nonirradiated food, 16 were in the treatment group fed irradiated food preserved at the first level of irradiation, and 15 were found in the treatment group fed irradiated food preserved at the second level of irradiation.

The rat is subject to an inflammatory process of the muscular arteries which has many of the characteristics of periarteritis nodosa of man.[3,17] In this study, lesions were found principally in the mesenteric arteries of the small intestine and in the arciform arteries of the kidneys. They were found less frequently in the muscular arteries of the pancreas, testes, uterus, heart, and areolar tissues surrounding the salivary and thyroid glands. The widespread organ involvement by periarteritis nodosa, so frequently observed in man,[18] was not the general rule in this series of rats. In particular, the simultaneous involvement of peripheral nerve, muscle, mesenteric, and renal arteries, the most common combination in human periarteritis nodosa, was observed only occasionally in these rats, as was involvement of lung, liver, skin, and central nervous system.

Dr. Skold, Lieutenant Colonel, V.C., U.S.A. (Ret.), was at the Armed Forces Institute of Pathology, Washington 25, D. C., at the time this work was done. He is now in the Graduate College, Iowa State University, Ames.

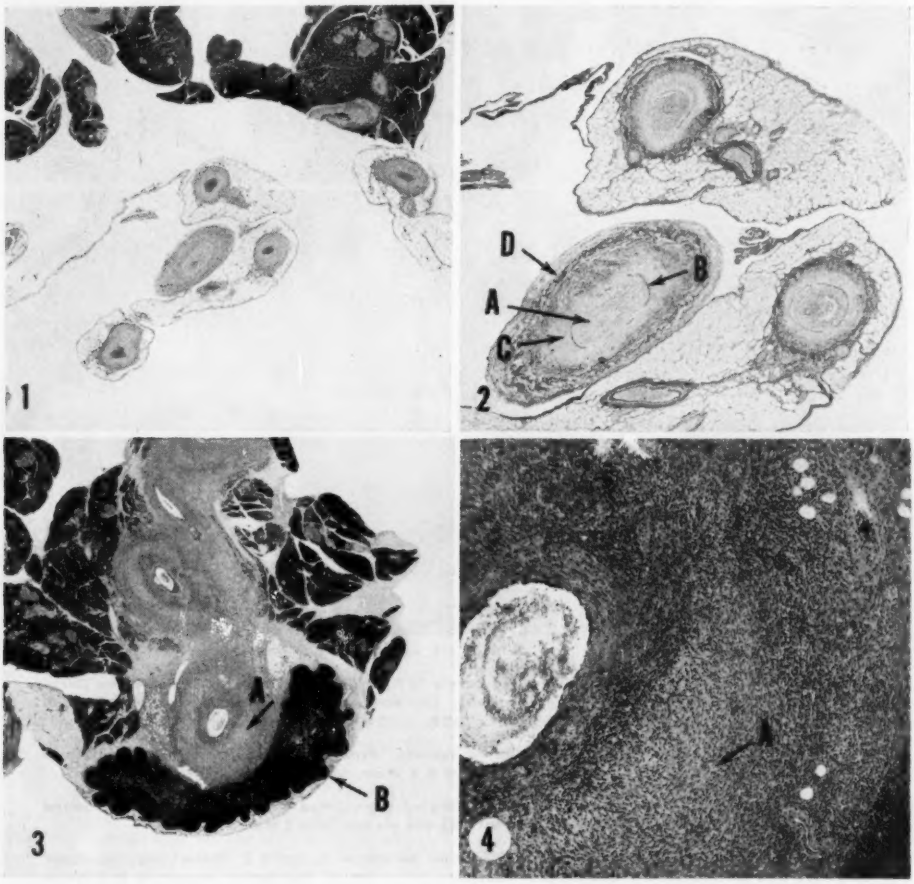
Lesions

The gross lesions seen at necropsy were nodules, 2 to 4 mm. in diameter, along the branches of the mesenteric arteries. These affected arteries were, at times, undergoing aneurysmal dilatation. If these abdominal aneurysms had ruptured, their presence was obscured by the blood contained in the abdominal cavity. The lesions were so small that it was difficult to see them grossly; however, the nodules could be palpated[16] and felt like bits of wire. Occasionally, only the pancreatic arteries were involved.

Analogous to human periarteritis,[1] the microscopic lesions in the rat were divided into various stages, which occurred simultaneously in the same rat and even in the same organ. There was an early inflammatory response in and around the vessel wall in some rats, with an infiltration of neutrophilic leukocytes and lymphocytes and, later, a decrease in neutrophils and an increase in lymphocytes, plasma cells, and eosinophils. Eosinophils were not seen constantly. Fibrinoid necrosis of vessel walls was observed, with marked swelling and destruction of the muscle and elastic tissue and, often, the formation of an aneurysm. One or more layers of the affected muscular arteries were involved, in addition to the surrounding perivascular tissue. With the fibrosing and scarring of the wall of the vessel and the intimal proliferation, there was an associated narrowing of the lumen in which thrombosis frequently occurred. The final appearance of the healed lesion often was indistinguishable from the healed stage of any type of arteritis. Acute and healed stages of focal arteritis were frequently observed in the same animal. Healed, fibrosed lesions predominated.

In the kidneys, lesions compatible with pyelonephritis, including dilated convoluted tubules, were seen in rats with and without chronic arteritis. Some typical lesions of arteritis in the laboratory rat are shown in the illustrations (fig. 1-8).

Periarteritis of man and chronic arteritis of rats, referred to by some as periarteritis in rats, have been reported in the literature.[1-18] In human periarteritis nodosa, the lesion occurs in all periods of life, primarily in the male and in the age range of 20 to 40 years, whereas lesions of chronic arteritis in rats seem to be limited to older animals. These findings in older rats were reported by other workers.[15,17] In this report, the average age of the rats with



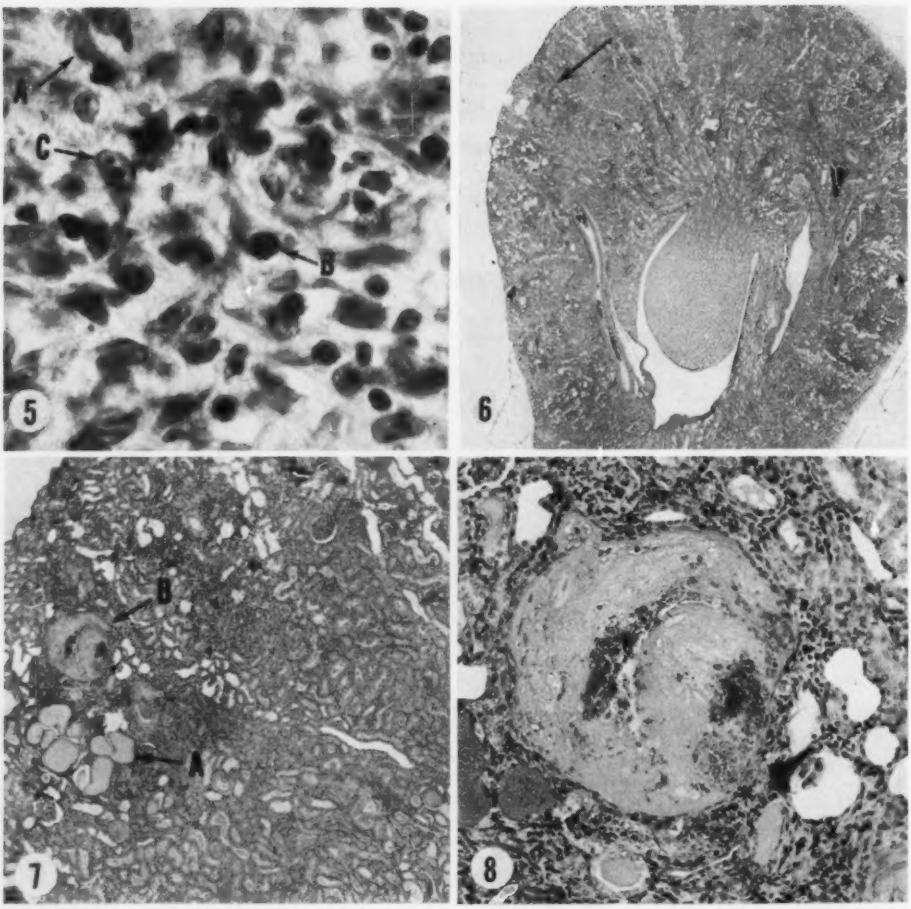
(1) *AFIP*—58-8510; (2) 58-8512; (3) 58-8712; (4) 58-8711.

Fig. 1—Branches of the mesenteric arteries showing thickening of media. H & E stain; x 7.

Fig. 2—Special staining shows (A) intimal proliferation; (B) internal elastic membrane; (C) tunica media; (D) adventitia. Hart/vanGieson's stain; x 16.

Fig. 3—Pancreatic arteries: (A) thickened media; (B) pancreatic glandular acini. H & E stain; x 10.

Fig. 4—Higher power of area in figure 3; (A) thickened media, with swelling of the vessel wall, fibroblastic thickening, and destruction of the muscle and elastic tissue. H & E stain; x 60.



(5) *AFIP*—58-8710; (6) 59-3351; (7) 59-3341; (8) 59-3343.

Fig. 5—Higher power of area indicated by arrow in figure 4 shows cellular detail of the fibroblastic thickening in the media: (A) fibroblast; (B) eosinophil; (C) macrophage. H & E stain; x 630.

Fig. 6—Cross section of kidney with dilated tubules. Area shown by arrow is a hyalinized arciform artery. H & E stain; x 8.

Fig. 7—Higher power of area in figure 6. Dilated convoluted tubules at (A) and medial sclerosis of arciform artery at (B) are visible. H & E stain; x 35.

Fig. 8—Higher power of arciform artery indicated by arrow B, figure 7. There is hyalinization and necrosis of the media and almost complete occlusion of the vessel lumen. H & E stain; x 165.

chronic arteritis was 498 days. The youngest rat affected was 134 days old; the oldest was 698 days old. The occurrence of periarteritis in man is comparatively rare, but chronic arteritis in the rat is encountered rather commonly. In both man and rats, the small and medium-sized muscular arteries seem to be the site of greatest vulnerability.

Clinical Signs

Clinical signs of chronic arteritis in rats are weakness and a gradual loss in weight.

Diagnosis

Diagnosis is made chiefly at the time of postmortem examination. However, it seems possible that the disease may be recognized before the death of the rat. Weekly physical examination of the rats should include weighing and palpation of the abdominal wall for the presence of "beading" along the vascular bed of the mesentery, particularly at the point of attachment of the mesentery to the small intestine. Rats may be killed to confirm the presence of intra-abdominal nodules when this is indicated by palpation and is accompanied by weight loss.

Discussion

It is well known that inflammatory arteritis occurs in the rat and other laboratory animals, but this has not been adequately documented in the veterinary literature.

It has been reported that periarteritis nodosa occurs in man as a recurrent, progressive, necrotizing, inflammatory disease of muscular arteries. The lesions begin as foci of degeneration and proliferation in the crotch of bifurcations and branchings, particularly where medium-sized arteries branch off to vessels of much smaller caliber, as in the hilar regions of the abdominal viscera and near the mesenteric attachment to the intestine.[18] These sites are the same as those found in the rat.

Despite considerable study, the cause of periarteritis nodosa in man has remained obscure. Infections, toxins, viruses, and allergies have been implicated. Even less is known about the cause of the spontaneous occurrence of this lesion in the laboratory rat. For this reason, the lesion is referred to here as chronic arteritis of undetermined origin and is not considered as a specific entity having an established cause.

The incidence of chronic arteritis in rats reported by other workers[17] was 9.7 per cent, whereas the incidence in this study was 43.0 per cent.

This study indicates that the rat arterial system is subject to an inflammatory lesion that has many of the characteristics of periarteritis nodosa in man. Further investigation is warranted.

Summary

1) Vascular lesions involving the small muscular arteries, chiefly of the mesentery and kidney, were observed in 47 of 108 laboratory rats.

2) These lesions occurred in older rats and resembled those of periarteritis nodosa in man.

3) Both the early and late stages of the vascular lesions were observed, frequently in the same rat.

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Industry Looks at the

Food Additives Amendment

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THE 1958 Food Additives Amendment to the Federal Food, Drug, and Cosmetic Act, originally enacted in 1908, probably represents as significant a modification of that Act as did the amendment of 1938, and it is probable that its provisions will have as sweeping an effect on the industries involved as did the 1938 amendment.

The food and drug amendment of 1938 prohibited the use of any poisonous or deleterious substance as a food additive. The only exceptions to this were situations in which the presence of such a substance could not be avoided by good manufacturing practice or in which it occurred as a chemical residue in the production of natural food. The use of pesticides in agricultural production was the primary reason for permitting, administratively, a maximum safety tolerance. In time, this part of the 1938 amendment became inoperable because of the increased use of more complex pesticides and insecticides.

In strict interpretation, this old law had several weaknesses: first, food had to be injuriously consumed before the law could be applied; second, proof of unsafeness fell upon the agencies of the government; third, and probably most important, it dealt with poisonous or deleterious substances in an absolute sense and permitted no consideration of conditions or levels of use for adding to foods.

Amendments to Bill

The need for amendment was recognized, and a House committee held public hearings on the problem during 1950-1953. At the end of these hearings, the Select Committee to Investigate the Use of Chemicals in Food Products (the Delaney Committee) concluded that there was a need for the use of many chemicals in our food supply, that scientists collaborating with the food and chemical industries had solved their problems well, but that the public still needed some protection against the inadvertent errors or deliberate manipulations of some small irresponsible elements.

The immediate result of this report was the introduction of several bills into Congress. The Miller Pesticide Residue Amendment was the only bill to pass, becoming law in 1954. It specifically regulated pesticide chemicals, prohibiting any residues therefrom in fruits or vegetables unless such residues were within the limits of a safety tolerance which had been scientifically established.

Other bills were introduced later and were referred to the House Commerce Subcommittee on Health and Science. Hearings were held from 1956 until April 15, 1958. The final result was that this Subcommittee unanimously reported the Administration bill out on July 1, 1958. Reintroduced as a "clean bill," incorporating the changes of the Subcommittee, it was reported out by the same committee on July 28, 1958, and was passed by the House, with the Delaney cancer clause added, on Aug. 13, 1958. It was subsequently passed by the Senate with minor amendments and became law on Sept. 6, 1958.

The Food Additives Amendment itself is long and technical, covering 6 printed pages. The definition therein is rather complex, but it may be simply stated that a food additive is any substance (especially a chemical one) intentionally and directly added to a human or animal food or drink in its production or manufacture, if such a substance is not generally recognized as safe under the conditions of its actual or

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intended use. There are exceptions to this in that the term does not include pesticide chemicals or those substances controlled under the Poultry Products Inspection Act and the Meat Inspection Act.

The amendment provides for the filing of information on a new food additive with the Secretary of the Department of Health, Education, and Welfare. This information must include such points as the chemical composition; the proposed use, including specific directions and recommendations; and other relevant data bearing on the physical or other technical aspects of the additive. Also, there must be information describing the effects that the additive is intended to produce and the quantity required to produce this effect. A description of the assay methods used to determine the quantity of such an additive (or by-product therefrom) present is also necessary.

Within 90 days after the petition has been filed, the Secretary shall publish a regulation describing the conditions under which the additive may be safely used. This regulation will include the specifications necessary to delineate the particular food or classes of food in which the additive may be used, the maximum quantity which may be used or permitted to remain in food, the manner in which it may be added to or used in food, and any directions or other labeling or packaging requirements deemed necessary to insure continued safe use.

After all of this has been done, then and only then can the additive be used in a food.

When this amendment became law, it was with the provision that it should take effect 180 days later—March 6, 1959. It was also provided that in the case of food additives which had been used prior to Jan. 1, 1958, an additional year would be permitted before the amendment applied. That year could be extended for another year in order to carry out scientific studies to establish maximum tolerances if the Secretary of Health, Education, and Welfare ruled that there would be no undue risk to the public health in so doing.

Delaney Clause

The Delaney clause, or so-called "anti-cancer clause," was added to the amendment at the last moment. It provides that no food additive "shall be deemed to be safe if it is found to induce cancer when ingested by man or animal, or if it is found, after tests which are appropriate for the evaluation of the safety of food additives, to induce cancer in man or animal. . . ."

Having reviewed the background of the amendment and its pertinent requirements, let us take a look at its good points.

Basically, the amendment is sound and good. The Food Additives Amendment was designed to protect the health of the consumer and to insure this protection before any harm occurred. Before its effective date, it was possible to market products without submitting proof as to their safety. The only control that the FDA had was if a particular chemical could be established as unsafe for use. To do this, it was necessary for the FDA literally to "start from scratch" in setting up pharmacologic and toxicologic studies on a new chemical.

Many companies have traditionally pretested chemicals which they proposed to use as food additives. However, as in any industry, there exist some companies which, through ignorance or design, would market a product without adequate testing. The present Food Additives Amendment is controlling these irresponsible segments and eliminating the danger of the public's receiving harmful chemicals in food.

Furthermore, through the definition of the term "food additive" it has been possible to bring many potentially dangerous or unsafe chemicals used in the food industry under this pretesting program. Just to mention a few, these include chemicals used in producing a food, such as pesticides, insecticides, and growth stimulants; chemicals used in manufacturing a food, such as preservatives and antioxidants; chemicals used in packaging a food, such as residual chemicals in containers and wrappings, which may be transferred to the food itself; and chemicals used in treating foods, such as those used for ripening certain fruits and for bleaching purposes.

Chemical Additives

Another intent of the law is to prevent deception of the public through the use of chemical additives. At the time the original Food, Drug, and Cosmetic Act was passed in 1908, it was said that the ancestors of a pound of "hamburger" might be anything from cat to buffalo. Some of the chemical additives which have been used or proposed

for use in foods during the past 20 years apparently were designed to make buffalo look like young steer. The present law provides that food additives shall not be used for such deceptive practices, thereby again serving to protect the general public.

Finally, among the many good points of this amendment is that it allows for the advancement of food technology by permitting the use of certain chemical additives at safe levels. In other words, it provides for the establishment of tolerances for food additives. Under the old law, the use of additives was prohibited at any level if they were shown to be poisonous or deleterious, unless their inclusion could not be avoided by good manufacturing or farming practice. The present law is intended to permit the advance of research in agriculture—and, consequently, an increase in our nation's food supply—by permitting the Secretary to establish tolerances which have been shown by scientific experimentation to be adequate for a specific purpose and to be safe when the chemical is used within the tolerance limits.

As stated before, this amendment is basically a good law and one which, if interpreted in the spirit and under the intent as stated by Congress, could be of great benefit to the American people.

Industrial Problems

Now let us take a look at some of the more difficult situations which have arisen for industry under the interpretation and administration of this law during the past 18 months.

One of the first problems arose when industry tried to get an interpretation of the term "generally recognized as safe," which has come to be abbreviated into GRAS. Between the enactment of the law and its effective date, members of industry compiled lists of chemicals which were used in foods and which fell under the new definition of food additives. These lists were submitted to the Food and Drug Administration for its opinion as to whether such materials were GRAS.

Hesitating to take the full responsibility for this decision themselves, FDA officials sent these lists to a group of "experts" numbering about 800. It was hoped that there would be unanimity of opinion among these experts on the question of general recognition of safety of these various chemicals. Unfortunately, some of the scientists reported that they had had little experience with many of the specific chemicals and, consequently, did not know whether or not they were generally recognized as safe. The legal section of the FDA interpreted such reports as negative votes; unless there was essentially unanimity of opinion, and unless this unanimity was clearly stated, the food additive material could not be placed on a GRAS list.

It was almost impossible to get prompt replies on these lists from such a large group of scientists. Industry, therefore, could not get a firm decision from the Food and Drug staff, and we had long periods of indecision and worry about the ultimate fate of some of our large-volume food additive products.

This situation is improving as time goes along through the whittling down of the large list of experts and through the FDA's assumption of responsibility for making decisions as to the recognition of safety for many products. Even today, however, it is difficult to get a prompt answer when industry asks for the FDA's opinion with regard to the general recognition of safety for some of its products.

Another sore point with industry groups in the administration of the Food Additives Amendment has been the inconsistency of interpretations among the various groups who are responsible for administering this law. Opinions and actions in respect to a question from one company have differed from opinions and actions on the same question posed by another company.

Industry also faces a problem involving the extensive testing requirements before a food additive petition can be submitted. Under an outline established for the pharmacologic data needed to show the safety of food additives, industry is required to make acute toxicity studies on at least 3 species of animals and to determine an $l.d._{50}$ on each of the species. Subacute studies, usually for 90 days, are required on 2 species of animals. Finally, chronic toxicity studies extending for a period of at least 2 years are required; in these, there must be established a "no effect" level of dosage, a "serious effect" level, and a third level between these 2 extremes. A control group must also be included with these studies. At least 2 species and preferably more are required for the chronic toxicity studies.

Complete clinical laboratory and biochemical testing must be done, including study of pathologic changes. In order for these studies to be significant, a large number of animals must be used, the skills of many technically trained people are required, and, consequently, the cost of such studies is high. Due to the tremendous expense involved in the testing program, many potentially useful products are never marketed because their sales volume would not compensate for this testing.

These tests are required whether the proposed compound has a significant degree of toxicity or whether it is so completely innocuous as to make the necessity of the complicated and expensive tests ridiculous. To illustrate the kind of impractical and unrealistic situation which can arise from the requirement to show a "serious effect" level for an innocuous substance, the case of gibberellic acid might be cited. This chemical is extremely nontoxic. It was humorously stated in the petition to the Secretary that the only way to produce toxicity in rats with this chemical would be to compress it into bricks and drop them on the animal, thus establishing an $l.d._{50}$ depending upon the weight of the compressed bricks. How could one show a "serious effect" level for such a product?

Delaney Clause Interpretation

One of the most unrealistic features of the bill from the viewpoint of industry is the so-called "Delaney clause," the anticancer clause which was described earlier. Much has been stated and published concerning the effects of the Delaney clause on industry, due to the strict literal interpretation by the Food and Drug Administration. This "per se" interpretation overrides that good point of the bill which provides for advancing technology by permitting the use of chemicals at safe levels.

In reporting the Food Additives Amendment, the philosophy of the House Committee on Interstate and Foreign Commerce is reflected in the statement of a member of the Committee, Congressman John Bell Williams of Mississippi, who said: ". . . the safety of a given additive involves informed judgments based on educated estimates by scientists and experts of the anticipated ingestion of an additive by man and *animals under likely patterns of use.*"*

This same emphasis was stressed in a letter from the assistant secretary of Health, Education, and Welfare to the chairman of the House committee, in which he stated: "Any indication that the additive may thus be carcinogenic would, under the terms of the bill, restrain the Secretary from approving the proposed use of the additive unless and until further testing shows to the point of reasonable certainty that the additive would not produce cancer and thus would be safe *under the proposed conditions of use.** This would afford good, strong public health protection."

Nevertheless, in interpreting this anticancer clause, the FDA uses the development of tumors in a specially selected strain of mice highly susceptible to cancer as the basis for declaring certain compounds carcinogenic. The dosage used and the method of administration need not resemble in any way whatsoever the proposed conditions of use. In spite of the Committee's emphasis on levels of intended use, this interpretation has not been followed since the enactment of the bill.

As a consequence of this rigid interpretation, agriculture has today 2 important chemicals which are considered carcinogenic by the FDA. Their present use cannot be extended and new uses are prohibited. These substances are diethylstilbestrol and arsenic compounds used in animal feed additives.

Feed Additives

Many scientists have reported on the lack of residue in meats produced with stilbestrol. The Secretary of Health, Education, and Welfare has also stated that no detectable residue remains in beef and sheep fed stilbestrol. Yet stilbestrol faces a continuing problem under the Delaney amendment because it can be made to produce cancer under certain conditions in guinea pigs, Syrian hamsters, and in a few selected strains of mice and rats.

Cancer has never been produced with stilbestrol—even when efforts were made to do so—in most strains of mice and rats, nor in any monkeys, dogs, cats, goats, rabbits, pigs, many breeds of chickens, turkeys, and pheasants. Neither has cancer attributable to stilbestrol been reported in the millions of cattle and sheep to which it has been fed.

*Emphasis added by author.

We have here, then, a product known to be safe on the basis of long and widespread experience with both man and animals. And yet this valuable product could never have been developed under the present interpretation of the Delaney amendment, and even now additional uses of the product are prohibited.

. . . The danger of such a ban on safe and beneficial products threatens to impede the quest of scientific research for more useful agricultural chemicals.

Under the rigid interpretation of the Delaney clause, no new feed additive may be added to a feed already containing either arsenic or diethylstilbestrol, which are interpreted to be carcinogenic. As an example of how this can affect agriculture, the case is cited of a new feed additive with low toxicity and excellent growth promotion qualities for swine which is now undergoing field trials. This valuable new additive will not be permitted for use in feeds containing arsenic—and this is reported to be nearly 80 per cent of swine feeds. Progress in the field of agriculture and in increasing the world's food supply is, therefore, stifled by an arbitrary interpretation of this clause in an otherwise good law.

In testifying before the House Committee on Interstate and Foreign Commerce on behalf of the Pharmaceutical Manufacturers Association, Dr. Thomas P. Carney, vice-president of research, development, and control of Eli Lilly and Company, stated with regard to the Delaney anticancer clause: "Such a clause, as I have demonstrated in the case of stilbestrol, can inhibit or prevent the use of safe and highly beneficial agricultural chemicals for reasons totally unrelated to their actual use. Even more serious, perhaps, the danger of such a ban on safe and beneficial products threatens to impede the quest of scientific research for more useful agricultural chemicals."

One hundred years ago, a farmer in this country produced enough food for himself and only 3 other people. Thirty years ago, he produced for himself and 9 other people. Today, he produces for himself and 25 others.

Today's agricultural production is being accomplished by 7½ million farm workers. This is 33 per cent fewer than there were only 20 years ago, and yet this group is feeding a population more than 33 per cent greater than at that time. Since 1954, the withdrawal of agricultural land for use as homes, industrial sites, airports, and highways has exceeded the land reclaimed, and the number of farm acres has declined. We have been fortunate in the past in our ability to meet the demands placed upon agricultural production. But what about the future?

It is possible to foresee the situation developing by 1975, in which people may be going to bed hungry, in the midst of technologic plenty, unless the situation is corrected.

The per se interpretation of the Delaney clause has caused the retrenchment of some of the agricultural research programs of at least 2 large companies. The probability is that almost any chemical which can have a significant effect as an insecticide, pesticide, or a growth promotant will also increase the incidence of tumors under special conditions in specially selected strains of susceptible animals when fed at high levels far beyond those levels of intended use. By the very nature of the chemical characteristics of such products, this reaction could be anticipated. And yet, under the Delaney clause, such chemicals cannot be used for man or animal at any level. Consequently, agricultural research must suffer.

If so much emphasis is to be placed on cancer in a law such as this, why do we not also ban substances which might cause atherosclerosis, high blood pressure, or a host of other disorders? Such a question was asked by the commissioner of the Food and Drug Administration in testifying before the House Committee on Interstate and Foreign Commerce 2 years ago, when he stated that he saw no more reason to single out cancer for specific mention in this legis-

lation than to single out some of these others.

Along with the singling out of cancer in the Food Additives Amendment through the Delaney clause, the technique of regulation through press conferences and the use of fear has been distasteful to industry.

The "cranberry episode," the press conference on stilbestrol in chickens, and the less widely publicized situation regarding folic acid in multiple vitamins have gone far to lessen the confidence of the public in the food industry—both in the manufacturers of the chemicals used for more efficient food production and in the agricultural industry which produces the food itself.

In order to achieve the benefits of some of the basically sound legislation which is part of our law today, we must maintain the public's confidence in our agricultural industry. Industry's goal must be the maintenance of what Vice-President Nixon referred to in his acceptance speech as "the highest standard of living in the whole world."

Conclusion

In the eyes of industry, the Food Additives Amendment *is* a basically sound piece of legislation, a bit of legislation which is intended to protect the health of the consumer and which is intended to advance technology by permitting the use of desirable chemicals at levels established as safe by scientific experimentation.

Mr. John Harvey, deputy commissioner of food and drugs, aptly summed up the logic of the food additives legislation in a speech before the Food Law Institute in November, 1958, when he said: "The judgmental decision as to how much of what may be allowed in food is essentially a scientific one. It is not in our view an academic scientific decision, but is a decision to be made by working scientists who are actively engaged in study and research in the particular scientific field."

The Food Additives Amendment will work for the public good if it is given half a chance. Let us hope that it has this opportunity in the future.

Oxygen Antidote for Local Anesthetic Drug Toxicity

For many years, barbiturates have been used for prophylaxis and treatment of systemic toxic reactions to local anesthetic drugs. In a study of 533 systemic toxic reactions and their treatments in 36,113 regional block procedures, it was found that (1) the reactions were a result, not of an allergy, but of a high concentration of the drugs in the blood; (2) barbiturates used to treat such reactions may do harm rather than good and may hasten the death of a patient; (3) barbiturates given preoperatively did not prevent reactions; (4) correction of oxygen want was the key to successful treatment of such a reaction; and (5) succinylcholine chloride, not a barbiturate, is now the preferred drug to stop convulsions and allow adequate oxygenation of an affected patient.—*J. Am. M. A., 174, (Oct. 15, 1960): 842.*

Editorial

Exotic Diseases on the Move

Guest Editorial

Several highly fatal animal diseases have recently spread remarkably into previously unaffected regions of the world after long confinement in relatively small areas. These diseases, already causing such serious losses as to be of international economic importance, are continuing their rapid spread. If the continuing spread of these plagues is to be halted, the veterinarians of each nation, including those in the United States, must be prepared to diagnose and stamp out the first cases which appear. Further, if veterinary medicine is to face up to the challenge, we must recognize that opportunities are being missed to control and eliminate these diseases while they are relatively confined.

African swine fever, similar to hog cholera but immunologically distinct and essentially 100% fatal, has spread to Spain, causing losses estimated in excess of 100,000 head. Caused by a hardy virus against which there is no vaccine, this disease has long prevented successful, commercial swine production in much of Africa. It is now diminishing the meat supply of Europe.

Bluetongue was strictly an African problem for over 100 years before it was found in Cyprus in 1924. It did not get to nearby Turkey and Syria until about 1944; from then on its spread has been rapid and relentless: 1947, United States; 1956, Portugal, Spain, and Morocco; 1959, Arabian Peninsula; and now to Japan where great losses are occurring. The spread of bluetongue by Culicoides gnats has demonstrated the potential of this vector, which is also active in the rapid transmission of African horse-sickness.

Since late in 1959, African horse-sickness has spread from the historically enzootic areas of Africa to 8 countries of the Near East and southeast Asia, causing an estimated loss of 170,000 horses, mules, and donkeys. Transmitted by Culicoides which have a near world-wide distribution, this viral disease has a great potential for continued spread to the rest of the world. With a mortality rate of about 80% in horses, it threatens not only the equine population but also the food supply of the many countries where these animals provide most of the agricultural power and transportation.

Lumpy-skin disease, which has been the most costly cattle disease of South Africa in recent years, is also on the move. This insect-borne viral disease first appeared in northern Rhodesia in 1929. The opportunity for eradication was missed during the next 15 years before it moved to neighboring countries. Now it has spread over much of southern Africa and across the channel to Madagascar.

Our intense importation of primates from Africa poses a new hazard for the introduction of Rift Valley fever. Antibodies against this disease have been found in 7 species of African monkeys and they are known to have a clinically silent viremia for several days after infection. Mosquitoes capable of transmitting this disease are prevalent in the United States. Not only has Rift Valley fever been known to kill up to 90% of lambs, 45% of adult sheep, and 25% of cattle on some affected African farms, but it also has been known to cause illness in an estimated 70% of the people involved.

Fortunately, we in the United States have rarely had to cope with diseases which are capable of destroying from 50 to 100% of a given farm animal species.

Many new opportunities for these diseases and their vectors to spread have been provided in recent years by the ever-increasing speed and volume of trade and traffic between all continents. Modern transportation has put an end to the era when distance alone could be relied upon for isolation as a defense against exotic diseases.

All nations which benefit from the increased trade and travel must face the disease problems created and support the development and application of veterinary science essential for disease control at home and abroad. If this is not done, we may find ourselves attempting to explain the death of large numbers of animals

from such diseases as African swine fever, for which we have no vaccine or treatment. Veterinarians only a few hours from our shores are facing this problem and are probably wondering why the profession has failed to prepare them for the emergency.

Livestock production is a major factor in the economy of many undeveloped countries. Many of these countries are unable to engage their animal products in world trade because of a few prohibitory animal diseases. These diseases prevent the exchange of meat, greatly needed in other countries, for much desired finished goods in search of a market. An improved economy based upon productivity and trade would offer great hope to nations now handicapped by a few animal diseases.

If we are to effectively render assistance to friendly countries, protect our own livestock, and provide competent veterinary support to clients, we must sponsor and participate in research and training programs directed toward the control and eradication of these highly destructive diseases wherever they exist.—*Col. Fred D. Maurer, D.V.M., Ph.D., Chief, Veterinary Pathology Division, AFIP, Washington, D.C.*

Long-Term Effect of Ultrasonic Energy on Dogs

Cell structure, distribution of inorganic content of bone, and the basic pattern of collagen bundles of femurs of adult dogs apparently were unaffected by exposure to ultrasound in dosages varying from 0.6 watts to 2.0 watts per square centimeter for periods of 1 year to 3 years and 9 months from the date of the last exposure to ultrasound. An aortogram made just prior to death of 1 dog indicated an apparent segmental occlusion of the superficial femoral artery on the side exposed to ultrasound.—*Proc. Mayo Clinic, 35, (Nov. 9, 1960): 663.*

Tissue Culture on Polyethylene

Fragments of solid organs can be squashed without destroying viability to form a thin sheet of cells which may be stuck to polyethylene film with clotted mouse plasma. The film conveniently floats on a simple culture medium in which embryonic tissues multiply within 24 hours and adult tissues survive for several days. The tissue on the polyethylene is thin enough to mount on a microscope slide and examine with phase-contrast illumination and an oil-immersion objective. Since polyethylene is inert to most organic solvents, the tissue can be stained and mounted, using standard histologic techniques. The squashed tissue on polyethylene is more readily infected by viruses and more easily examined than are fragments of tissue embedded in plasma on a coverglas.—*J. Gen. Microbiol, 22, (1960): 416; abstr. Vet. Bull., 30, (Sept., 1960): item 3111.*

from the *Research Journal*

Phase Differences in Uterine Response

When *Escherichia coli* or *Staphylococcus aureus* were artificially introduced into the uteri of rabbits, faster destruction of each took place in the uteri of rabbits whose ovaries were in the follicular phase regardless of time. That *Esch. coli* was destroyed more rapidly than *Staph. aureus* was not related to the hormonal state. When the infected uterine horns were ligated to prevent cervical drainage, it was found that cervical drainage apparently did play a part in faster elimination of bacteria from the uterus of rabbits in the follicular phase, but this accounted for only a part of such elimination. Attempts to estimate the number of bacteria eliminated by cervical drainage by bacteriologic examination of the vagina failed, due apparently to the ability of the vagina to destroy bacteria and to other causes.

The number of surviving bacteria was related linearly to the number of leukocytes in the uterine lumen in animals in the luteal phase but not in those in the follicular phase, possibly indicating a phase difference in the activity of leukocytes or in the operation of a nonleukocytic bactericidal factor in uteri during the follicular phase.

No over-all difference due to hormonal state existed in the amount of bactericidal activity of cell-free uterine exudates *in vitro*. However, at 5 hours after inoculation, considerably more bactericidal activity against *Escheroichia coli* existed in exudates of animals in the follicular phase.—[*A. J. Winter, A. W. Broome, S. H. McNutt, and L. E. Casida: Variations in Uterine Response to Experimental Infection Due to the Hormonal State of the Ovaries. I. The Role of Cervical Drainage, Leukocyte Numbers, and Noncellular Factors in Uterine Bactericidal Activity. Am. J. Vet. Res., 21, (July, 1960): 668-674.*]

Mobilization of Leukcoytes in the Uterus

A study has been made of the various aspects of leukocyte mobilization in uteri of rabbits in the follicular and luteal phases, following experimental infection with *Escherichia coli* and *Staphylococcus aureus*. The results fail to indicate that differences in the level of leukocytes circulating in the blood of animals in the different reproductive phases are responsible for the difference in bactericidal action of their uteri. Similarly, this differential bactericidal action does not arise from a difference in the number of neutrophils normally present in the uteri during the follicular and luteal phases prior to infection. Evidence is presented which suggests uteri in the follicular phase are capable of producing, or releasing, a leukotaxic factor at an earlier stage of the infection process than uteri in the luteal phase. The results also suggest that it is more difficult for leukocytes to pass through the endometrium of uteri in the luteal phase once they have been mobilized from the blood stream.

Ligation has a greater effect on the number of leukocytes accumulating in uteri in the follicular than in the luteal phase. In addition to disposal of leukocytes by drainage, it has been shown that fewer leukocytes were mobilized in the nonligated uteri.

Phagocytosis appears to play an important part in ridding the uterus of infections produced by *Staph. aureus*. The evidence obtained fails to indicate any difference in the phagocytic activity of leukocytes from uteri in the follicular and the luteal phases. It is suggested that a nonleukocytic defense mechanism may exist also in uteri during the follicular phase.—[*A. W. Broome, A. J. Winter, S. H. McNutt, and L. E. Casida: Variations in Uterine Response to Experimental Infection Due to the Hormonal State of the Ovaries. II. The Mobilization of Leukocytes and Their Importance in Uterine Bactericidal Activity. Am. J. Vet. Res., 21, (July, 1960): 675-682.*]

Infectious Meningo-Encephalitis in Cattle

An epizootic of bacterial encephalitis in feedlot cattle is reported; the disease was reproduced experimentally with a previously undescribed organism. Clinically, this disease was characterized by a brief prodromal stage of elevated body temperature and stiffness, which was followed by the rapid development of neurologic signs and, if untreated, death. Diagnostic gross lesions were confined to the brain, in which single or multiple hemorrhagic areas of softening were present. Microscopically, it could be seen that these lesions were produced by a bacterial vasculitis which led to thrombosis and infarction. The causative agent of this disease is a small, gram-negative coccobacillus which required blood and an increased CO_2 tension for growth upon primary isolation.—[*P. C. Kennedy, E. L. Biberstein, J. A. Howarth, L. M. Frazier, and D. L. Dungworth: Infectious Meningo-Encephalitis in Cattle, Caused by a Haemophilus-like Organism. Am. J. Vet. Res., 21, (May, 1960):403-409.*]

Effects of Temperature on Pregnant Mare Serum

This study was designed to investigate the effect of room temperature on the potency of pregnant mare serum (PMS) within a 72-hour period. The 536 female Swiss Albino mice used were 22 days of age at the time of injection and were killed 48 hours later. The PMS used was obtained from blood serum for diagnosis of pregnancy in mares and was assayed for potency in international units.

Mice in 1 group were treated with 1 I.U. of PMS that had not been exposed to room temperature; mice in another group were given the same serum after 24 hours at room temperature; mice in a third group were given serum after 48 hours at room temperature; and mice in a fourth group were given PMS after it had remained 72 hours at room temperature. The same experimental design was used to study the effect of room temperature on 2.0, 2.5, and 5.0 I.U. of PMS.

Seventy-two hours at room temperature inactivated practically all potency of gonadotrophins at the levels used in this experiment. The criteria used for testing gonadotrophic activity were macroscopic aspect of the reproductive organs, ovarian and uterine size and weights, and histologic structure of the ovary. The curve of the ovarian weights closely followed the curve of the uterine weights.—[*E. Santamarina and L. L. Joven: The Effect of Time and Temperature on the Gonadotrophic Potency of Pregnant Mare Serum. Am. J. Vet. Res., 21, (July, 1960): 585-590.*]

Effects of Testicular Biopsy

A study was made of the effects that testicular biopsy with a 12-gauge Vim-Silverman needle may have on spermatogenesis and testicular cytology in the bull. The criteria of evaluation were semen volume, spermatozoa per milliliter, spermatozoa per ejaculum, motility and abnormal forms of spermatozoa, and histologic study of biopsy and slaughter sections of the testicles. The study was divided into 2 parts: 1 concerned periods of approximately 6 weeks before, between, and after biopsies in 4 bulls; the other concerned a 5-week period before biopsies and a 10-week period 1 year after biopsies in 4 balls.

Based on the data collected, the biopsy procedure did not appear to affect spermatogenesis materially since, according to the criteria of the study, postbiopsy semen samples were within normal limits for such experimental bulls. Histologic studies of testicular sections taken at slaughter indicated that a transient calcification and alteration of the biopsy puncture site was present approximately 2 months after biopsy, but was resolved approximately 1 year after biopsy. Some biopsy punctures resulted in mild adhesions of the testicular tunics without interference of testicular function. Although cytologic studies indicated that testicular biopsy did not adversely affect spermatogenesis in these bulls, no tests were made of the fertilizing capacity of semen from the biopsied bulls.—[*L. E. McDonald: The Effects of Testicular Biopsy on Spermatogenesis and Testicular Cytology in the Bull. Am. J. Vet. Res., 21, (Sept., 1960): 767-774.*]

Teniacides in Dogs, Cats, and Chickens

In critical trials with several substituted diphenyl sulfones, one (bis[2-hydroxy-5-chlorophenyl] sulfone) had marked anthelmintic action against *Taenia taeniaformis* in cats and, to a lesser extent, *Taenia pisiformis* in dogs. It gave no promise of effective action against *Raillietina cesticillus* in limited trials with chickens.

The chemical was well tolerated in effective dosages, especially in cats. Emesis and soft feces, the only sign of toxicosis, occurred infrequently at doses rates approximating the optimum range, *i. e.*, 25 to 50 mg./per pound of body weight.—[*F. D. Enzie and M. L. Colglazier: Teniacidal Trials with Some Diphenyl Sulfones in Cats, Dogs, and Chickens. Am. Vet. J. Res., (July, 1960): 624-627.*]

New Books

Minks: Diseases and Parasites

This bulletin, based on nearly 15 years of research by federal and state agencies and by the fur-farming industry, is intended as a reference manual for mink ranchers. However, it also provides valuable information for veterinarians engaged in treatment and control of mink diseases because it is comprehensive and authoritative. Nine bacterial diseases, 2 virus diseases, 8 nutritional diseases, 15 parasitic conditions, plus sections on poisoning, vices, prevention and control, laboratory techniques, and shipment of specimens are included.—[*Minks: Diseases and Parasites. By J. R. Gorham, H. J. Griffiths, and R. Keith Farrell. 36 pages; illus. ARS, USDA, Superintendent of Documents, U. S. Gov't. Print. Off., Washington 25, D.C. 1960. Price: Paperbound $.20.*]

Report WHO Committee on Rabies

The Fourth Report of the Expert Committee on Rabies has been prepared as a self-contained document, thus minimizing the need to refer to previous reports.

The Fourth Report is composed of 9 sections: a summary of recent advances, diagnoses, vaccines, anti-rabies serum, prevention of rabies in man, control of rabies, exchange and dissemination of information on rabies, and future research. The last section is divided into 3 parts which deal with international veterinary certification of health and rabies vaccination for dogs and cats, a suggested method of case recording for human rabies exposures, and preparation of freeze-dried phenolized anti-rabies vaccines.

Of special interest to veterinary practitioners are the current recommendations for vaccinating dogs with both LEP (Flury) chicken embryo and phenolized vaccines, cattle with chicken embryo-adapted HEP (Flury) strain or inactivated vaccines, and cats with nervous tissue vaccine or HEP (Flury) strain vaccine.

Of interest to veterinarians who are high-exposure risks are the recommendations concerning prevention of rabies in man as well as a guide for postexposure treatment.

Sections on field application of canine vaccination, handling of dogs and cats bitten by rabid animals, administrative aspects of rabies control, and discussions of wild life rabies and bat rabies are also included.—*World Health Organization Technical Report Series; No. 201. Expert Committee on Rabies—Fourth Report. 28 pages; no illus.; paperbound. World Health Organization, Geneva, Switzerland, 1960. Price $0.30 (available in the United States from Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N.Y.)*

Scope of Veterinary Medicine in United States Reviewed at Conference

An over-all picture of the veterinary profession at work was presented at the third Conference on Public Health for Veterinarians at Cornell University last month.

The Conference, sponsored jointly by the New York State Veterinary College, the New York State Health Department, and the New York State V.M.A., was focused on recognizing the increasing problems in public health as the house pet and livestock population in this country mounts.

Here are some of the statistics presented at the meeting. A 3-year-old census of the pet population in the United States shows that there were at that time an estimated 25,000,000 dogs; 26,700,000 cats; 15,000,000 parakeets; 6,000,000 turtles; 100,000 monkeys, and 10,000 skunks being kept in American homes as pets. At least 55.6% of all the families in the United States have a pet of some kind.

Dr. John P. Ayres (COR '39), public health veterinarian of Binghamton, N.Y., said that each practicing veterinarian is, on the average, responsible for the health of 375 horses; 7,785 cattle; 2,577 sheep; 4,583 hogs; 31,063 poultry; 2,083 dogs, and 1,666 cats, in addition to other mammalian, reptilian, and bird pets. More than one-fifth of the veterinarians are engaged in small animal practice. Veterinarians serve about 300 zoos in the United States.

Veterinarians also inspect 20,000,000,000 lb. of meat and meat products for safety and wholesomeness, and about 34,500,000 dairy animals, including 23,028,000 milk cows, annually, he said.

Veterinarians aid in establishing and enforcing pure milk laws. They develop and administer programs in formal public health and research related to veterinary medicine at state, national, and international levels and supervise and produce $150,000,000 worth of biological products and drugs. They are called on to regulate and enforce import and export health requirements of 125,000 animals, exclusive of poultry, each year. They also help regulate intrastate and interstate traffic in animals.

From 900 to 1,000 research projects on animals' diseases—many of which affect man as well as animals—are being constantly conducted by doctors of veterinary medicine.

In addition, Dr. Ayres pointed out, veterinarians are responsible for resident undergraduate training of 2,500 students in nonprofessional courses in anatomy, physiology, and sanitation each year, for the professional education and training of 5,000 students in veterinary medicine, and for graduate training of 250 research and teaching specialists taking M.S. and Ph.D. degrees. They teach also, both on and off the campus, urban groups such as consumers, processors, and inspectors.

Twenty veterinary medical schools in the United States not only train and teach new veterinarians, but carry on research and conduct hospitals for animals simultaneously.

The one-day Conference on Public Health for Veterinarians was part of a 4-day program for veterinarians held at Cornell Jan. 3-6, 1961. The Fifty-Third Annual Conference of Veterinarians sponsored by the New York State Veterinary College at Cornell was also held at that time.

AVMA President-Elect Views Profession's Future

The future of veterinary medicine is "excellent, indeed, provided we rapidly re-orient ourselves to render more efficient professional service," said Dr. Mark L. Morris (COR '26), AVMA president-elect, in a

speech before the Intermountain V.M.A. January 12, in Salt Lake City, Utah.

He said that the world will need more veterinarians with even better training and more highly developed skills than we now have. To prove his point, Dr. Morris discussed briefly changes in livestock production and in economy, particularly relating his comments to the western states.

He quoted Dr. M. R. Clarkson (WSU '30), associate administrator, Agriculture Research Service, USDA, as having said, "The future will demand more intelligent management of larger herds, less trusting to chance, and more specialized knowledge in livestock production. Livestock owners will be increasingly concerned with disease prevention . . . preferring that to the higher cost of dealing with trouble after it starts." Dr. Morris pointed out that efficient production is not enough; veterinarians must also be concerned with processing and distribution of products to people throughout the world at a price they can pay.

What Veterinarians Can Do

Dr. Morris called upon veterinarians to effectively evaluate the opportunities and solve the problems facing them. He said that the AVMA is conscious of the rapid changes taking place and, to better determine the role of veterinary medicine, is preparing a prospectus which will be used for a thorough analysis of the profession.

He urged individual veterinarians to embark on programs of continuing education . . . "to inform themselves better in specialized fields and to keep abreast of scientific developments." He suggested attendance at educational meetings and study of scientific professional publications as methods of advancing education after graduation.

Dr. Morris also encouraged veterinarians to be active in the area of career recruitment. "When you know of a bright young man who may be interested in the medical sciences as a career, it would be very helpful if you would take time to visit with and encourage him to consider a career in veterinary medicine," he said. ". . . With the brilliant, well-trained young men who join our ranks yearly, we can only face the future with optimism."

Better Public Relations Will Help

In addition, Dr. Morris said, "the dissemination of information to the general public and the owners of animals concerning the veterinary profession and its activities is an important assignment to which each of us must give more attention. When one realizes that only 1 person out of 3 you meet on the street in any American city can tell you the answer to 'What is a veterinarian?' then you begin to appreciate the magnitude of the problem.

"With a public relations problem of this magnitude, it is easy to understand why the local druggist, feed salesman, or half-experienced layman develop the opinion that, with a little instruction from a detail man and a little reading on the side, he is ready to give advice on all problems of the medical care of animals. Doesn't this help to explain, at least in part, why you frequently encounter problems in your local community with infringements on the practice of veterinary medicine?" he said.

Dr. Morris reminded the group that, "As doctors of veterinary medicine, we are members of a dynamic, progressive profession on which rests a large responsibility for the public health and welfare."

Continuing Education Studied

At the annual meeting of the Council on Education, held Dec. 2-4, 1960, on the campus of Purdue University at East Lafayette, Ind., the Council's Committee on Academic Affairs presented a report on continuing education programs in the United States and Canada. After studying the over-all problem of continuing education, considering the suggestions received from various sources, and receiving a preliminary report on a nationwide survey of local veterinary associations and schools of veterinary medicine, the Council moved to recommend that the AVMA make available a list of veterinarians who conduct continuing education programs but indicated that no effort to certify these individuals should be taken by the AVMA. A preliminary report of the survey appears on adv. p. 40 of this issue.

List of Foreign Schools

The Committee on Education in Other Countries presented new or revised data on 25 foreign veterinary colleges. In accordance with the recommendations made by the AVMA House of Delegates in session at Denver in August, 1960, any AVMA listing

of foreign veterinary schools will include a statement explaining that omission of the name of a school should not be construed as disapproval since sufficient, current, and authentic data pertaining to that school may not be available.

Equine Encephalomyelitis

A resolution pertaining to changing the disease name "equine encephalomyelitis" was studied by the Council at the request of the AVMA House of Delegates. The Council agreed that the word "equine" should be dropped from the name of this disease, but questioned whether "encephalitis" is more appropriate than "encephalomyelitis." The Council referred the resolution to the American College of Veterinary Pathologists for an opinion.

National Board of Veterinary Examiners

The Council received the report of the National Board of Veterinary Examiners. Dr. R. E. Rebrassier's second term on the Board having expired, the Council elected Dr. W. G. Magrane to the Board. Dr. N. W. Pieper also represents the Council on this Board.

Officers Elected

New officers of the Council on Education are Dr. T. L. Jones, Guelph, Ont., chairman; Dr. W. E. Jennings, Chicago, vice-chairman; and Dr. R. E. Rebrassier, Columbus, Ohio, secretary.

The various committees of the Council were organized as follows:

Committee on Evaluation: Drs. N. W. Pieper, chairman; J. E. Greene; T. L. Jones; W. E. Jennings; and R. E. Rebrassier.

Committee on Academic Affairs: Drs. W. G. Magrane, chairman; H. J. Stafseth; N. W. Pieper; and C. K. Mingle.

Committee on Education in Other Countries: Drs. W. E. Jennings, chairman; C. K. Mingle; H. J. Stafseth; and W. G. Magrane.

Committee on Specialty Boards and Liaison: Drs. W. H. Riser, chairman; H. Marsh; R. E. Rebrassier; and W. E. Jennings.

Animal Nutrition Is Topic of International Conference

To disseminate information on nutrition and disease control in animals, the Second International Animal Nutrition Conference met in Madrid, Spain, Oct. 18-22, 1960.

The meeting was sponsored by the Soybean Council of America, the United States Feed Grain Council, and the Foreign Agricultural Service Division of the USDA. The sponsors hoped that the information exchanged at the meeting would show countries with limited resources how to provide more adequate nutrition for their people by improving and increasing the production of foods of animal origin.

Approximately 1/3 of the program was devoted to animal disease control. Veterinarians from Belgium, Denmark, France, Germany, Israel, Italy, Spain, and the United States participated. Veterinarians from the United States participating were: Drs. W. G. Huber (ILL '52) and R. P. Link (ISU '34), of the University of Illinois; H. C. H. Kernkamp (OSU '14), of the University of North Carolina; and B. S. Pomeroy (ISU '33), of the University of Minnesota.

Of the 50 participants on the entire program, 22 were from the United States.

ILAR Committee on Primates Reorganized

The Committee on Primates of the Institute of Laboratory Animal Resources has been reorganized to further develop standards for shipping primates used for research.

The new chairman of the committee is Dr. A. A. Creamer (UP '48), Merck, Sharp and Dohme. Committee members are Drs. Donald Dean (COR '41), New York State Department of Health; Donald DeValois, Eli Lilly and Co.; W. I. Gay (COR '50), National Institutes of Health; Ted Roth, Louis Ruhe, Inc.; and Mr. Stanley Gluck, Asiatic Animal Imports.

New International Group for Veterinary Parasitologists Formed

Veterinary parasitologists as well as research workers and teachers of parasitology have been invited to join a new association called the World Association for the Advancement of Veterinary Parasitology. The association is affiliated with the World Veterinary Association and will be represented

on its Permanent Committee at all World Veterinary Congresses. It was set up at the request of the Permanent Committee of the World Veterinary Association at the XVIth International Veterinary Congress in Madrid, Spain, 1959.

The purposes of the new association are to encourage research in veterinary parasitology, to promote exchange of information and material between individuals and organizations interested in this field, and to organize meetings for the study of parasites of veterinary importance.

Membership is open to persons who are actively interested in the advancement of veterinary parasitology. Non-veterinarians may be elected to membership provided that they are engaged in research or teaching concerned with parasites of veterinary importance, and that their number does not exceed 40% of the total association membership.

A draft of the association's statutes, prepared by the organizing committee, will be ratified at the next World Veterinary Congress in Hanover, 1963. At this meeting, officers of the association will also be elected. Members of the organizing committee are: Drs. E. J. L. Soulsby, Great Britain, chairman; W. S. Bailey (AUB '42), United States, secretary; and T. W. M. Cameron (London '21), Canada, advisor. A temporary executive committee made up of veterinarians from Peru, Australia, Japan, and Germany has also been appointed. It will function until the 1963 meeting of the association.

Veterinarians interested in receiving more information about the association should contact Dr. W. S. Bailey, School of Veterinary Medicine, Auburn University, Auburn, Ala.

Transoceanic Conference Panelists Selected

The subject and panelists of the first transoceanic telephone conference in veterinary history have been selected.

The American Animal Hospital Association has announced that the subject of the conference will be case studies in canine orthopedics. The transoceanic hook-up will link the annual meetings of the AAHA in St. Louis, Mo. and the British Small Animal Veterinary Association in London, England. Four panelists on either side of the Atlantic will participate in the conference.

Moderating the American panel will be Dr. Edward Ruebush (COR '43), Silver Spring, Md. Panelists will be: Drs. Wayne Riser (ISU '32), Kensington, Md., chairman; Wade Brinker (KSU '39), East Lansing, Mich.; Jacques Jenny (ZUR, '42), Philadelphia, Pa.; and Gerry B. Schnelle (UP '26), Boston, Mass.

Moderating the British panel will be Mr. Brian Singleton, London, England. Panelists will be: Mr. Gordon C. Knight, London, England; Mr. D. D. Lawson, Glasgow, Scotland; and Dr. Halfdan Moltzen, Copenhagen, Denmark.

The conference will be sponsored by Smith Kline & French Laboratories.

Veterinarian from Poland Visits AVMA

Dr. Henryk Janowski, president, Polish Association of the Veterinary Sciences, Warsaw, and head, Swine Diseases Section, Veterinary Research Institute, Pulawy, Poland, visited AVMA staff members recently.

Dr. Henryk Janowski

Dr. Janowski was in the United States for 2 months on a Rockefeller Foundation travel grant to study the organization and techniques of veterinary research at veterinary schools. He was particularly interested in research projects dealing with epidemiology of various swine diseases. He returned to Poland January 10.

Recent AVMA Research Fellows Report Accomplishments

Dr. Herbert W. Reuber, Received Ph.D. Degree as an AVMA Fellow

Dr. Herbert W. Reuber (ONT '44), an AVMA Fellow from September, 1955, to September, 1957, received his Ph.D. degree from Iowa State University in 1957. His thesis was entitled "Effects of Diethylstilbestrol Feeding on the Bovine Reproductive Tract."

Dr. Herbert W. Reuber

Dr. Reuber is now an associate professor in the Department of Physiology and Pharmacology, Oklahoma State University. He has held this position since he received his Ph.D. degree in 1957.

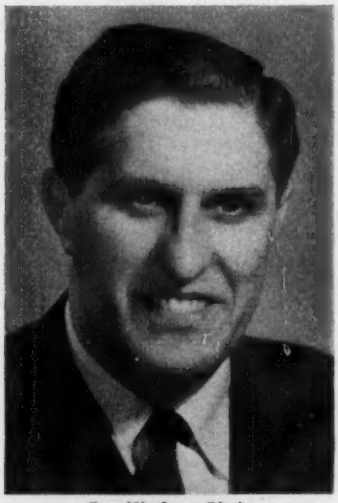
The senior author of 7 scientific articles dealing mainly with the feeding of stilbestrol to cattle, 3 of Dr. Reuber's articles have appeared in AVMA publications and another has been accepted for publication. They are "Effects of Diethylstilbestrol on the Bovine Reproductive Tract," *American Journal of Veterinary Research*, 19, 1958: 585; "Arteriography of the Internal Genitalia of the Cow," *J.A.V.M.A.*, 134, 1959: 101; "Genital Effects of Diethylstilbestrol in Beef Cattle, *J.A.V.M.A.*, 137, 1960: 304; and, accepted for publication, "Genital Effects of Implanted and Oral Diethylstilbestrol on Heifers." He is co-author of 3 other scientific reports.

Dr. Reuber is a member of the AVMA, the American College of Veterinary Toxicologists, and the American Society of Veterinary Physiologists and Pharmacologists.

Dr. Miodrag Ristic Earns Ph.D. with AVMA Fellowship

Dr. Miodrag Ristic (HAN '50), an AVMA fellow from 1957 to 1958, earned his Ph.D. degree at the College of Veterinary Medicine, University of Illinois. The title of his thesis was "Agglutination and Lysis Tests with Erythrocytes Absorbed with a Fraction of *Vibrio fetus*."

Since 1959, Dr. Ristic has been a professor of pathology and hygiene in the Department of Pathology and Hygiene, College of Veterinary Medicine, University of Illinois. Immediately after earning his degree in 1958, he went to Gainesville, Fla., where he was a professor of veterinary science at the University of Florida. He left this position in 1959 to join the faculty at the University of Illinois.



Dr. Miodrag Ristic

Dr. Ristic reports that during the last 6 years he has been a recipient of National Institute of Health research grants. He has received approximately $160,000 for research on anaplasmosis and vibriosis.

Dr. Ristic is the co-author of 38 articles for professional publications and the sole author of 4 others. He has published a similar number of popular articles on veterinary subjects. The *American Journal of Veterinary Research* has published 20 of his scientific works, and the JOURNAL of the AVMA has published 5. Most of his work is in the field of large animal veterinary medicine, and much of it deals with various aspects of *Vibrio fetus* and *Anaplasma marginale* research.

Dr. Ristic is a member of the AVMA, the Electron Microscope Society of America, and the Conference of Research Workers in Animal Diseases.

AVMA Fellow, Dr. E. Neil Moore, to Receive Ph.D. Degree

Dr. E. Neil Moore, Jr. (COR '56), an AVMA Research Fellow from 1956 to 1959, will receive his Ph.D. degree in 1961. The tentative title of Dr. Moore's doctoral thesis is "Effects of Repetitive Stimulation on Intracellular Cardial Recordings."

While he was an AVMA Fellow, Dr. Moore studied at Cambridge University, Cambridge, England (1956-1957) and at New York State College of Medicine, Syracuse (1957-1959). In 1959, he became a National Heart Institute postdoctoral fellow at New York State College of Medicine.

Dr. Moore is the co-author of 4 scientific publications and reports and the sole author of one. One report, co-authored by Dr. Moore, "Diagnosis and Successful Repair of Patent Ductus Arteriosis in the Dog—A Case Report," is scheduled to appear in the JOURNAL of the AVMA. "Intracellular Recordings from False Tendon and Ventricular Muscle Units of the Dog during Repetitive Excitation," also co-authored by Dr. Moore, was presented at the 1959 annual meeting of the AVMA. His other 3 manuscripts are scheduled for publication in various scientific journals.

Dr. Moore is a member of the American Association for the Advancement of Science, the American Association of Veterinary Physiologists and Pharmacologists, and the AVMA. He reports that next year he will be a research associate in the Departments of Surgery and Physiology at the State University of New York, Downstate Medical Center. At that time he will study atrial-ventricular conduction during cardiopulmonary bypass.

Dr. J. C. Hruska Completes AVMA Fellowship, Continues Education

Dr. James C. Hruska (MSU '51) earned his M.S. degree in 1959. He had been an AVMA fellow from January, 1958, to June, 1959. Now he is back at school, doing grad-

Dr. E. Neil Moore, Jr.

Dr. James C. Hruska

uate work at the University of Wisconsin and working as a project assistant in the Veterinary Science Department.

Dr. Hruska earned his M.S. degree at Michigan State University with the thesis, "A Study of Experimental Lathyrism in Baby Pigs." From July to December, 1959, he was employed as a research associate by Diamond Laboratories.

Dr. Hruska is a member of the AVMA.

AEC Appoints Dr. W. G. Magrane as Consultant

The Atomic Energy Commission has named Dr. William G. Magrane (MSC '40) as its consultant in the field of veterinary ophthalmology.

The Commission sponsors a number of animal colonies in various parts of the United States to determine the effects of known doses of ionizing radiation. Dr. Magrane will examine these animals at regular intervals to evaluate radiation effects upon animal vision. He has recently examined the eyes of burros, hogs, dogs, and monkeys which have been exposed to limited doses of radiation in several laboratories.

Dr. Magrane practices veterinary medicine at Mishawaka, Ind., and is a partner in the Magrane Animal Hospital of that city. He received a Master of Science degree in medicine from the University of Pennsylvania on an AVMA Research Fellowship; his subject was ophthalmology.

Dr. Magrane is a past-president of the American Society of Veterinary Ophthalmology and of the American Animal Hospital Association. He was the recipient of the "Veterinarian of the Year" Award for 1955 and of the American Veterinary Medical Association's Practitioner Research Award in 1958. He is presently serving on the Council on Education of the American Veterinary Medical Association and on the Veterinary Medical Examining Board for the State of Indiana.

Dr. William G. Magrane, Atomic Energy Commission consultant in veterinary ophthalmology (lower) and Captain Donald L. Anderson, U.S. Air Force veterinarian (upper), examine a hog at the University of Tennessee-AEC Agricultural Research Laboratory, Oak Ridge, Tenn., as a part of the Commission's continuing program of studying the biological effects of radiation. Dr. Magrane has recently been appointed a consultant by the USAEC.

Dr. M. G. Fincher Reports on Veterinary Medicine in South America

One of the objectives of the International Education Exchange Service of the U.S. Department of State, Washington, D.C., is to encourage veterinarians in South America to do a good job with their assignments. In connection with this program, I was assigned to contact agriculturists and veterinarians in agricultural experiment stations and colleges of veterinary medicine and to lecture or hold conferences and demonstrations.

Apparently, virus diarrhea and leptospirosis are not recognized in South America and may not exist there. No one knows, but South American veterinarians are looking for them.

Bovine mastitis causes serious losses in dairy cattle in all countries of South America because it occurs in its most acute and severe form. It follows the severe dermatitis of the teats that accompanies foot-and-mouth disease. So much skin is lost from the teats that cows have to be securely tied to be milked and naturally do not let down much milk. In the rainy winter season of July, cows were herded in yards deep with mud and filth after being manhandled to get a little milk from them. This practice and sore teats made a bad combination.

The average owner of dairy or beef cattle would rather forget foot-and-mouth disease after vaccinating for it, and discuss the possibility of vaccination to prevent tuberculosis or the use of modern "cures" employed in man to treat bovine tuberculosis in valuable breeding stock.

I did not insist that any of their ideas were wrong, but stressed the fact that our approach to total eradication of brucellosis and tuberculosis was effective, and that mastitis could be controlled if any group of veterinarians and their clients wanted to control it.

Veterinary practice in many parts of South America, as we know it here, is largely confined to valuable light horses, especially at the numerous race tracks and at a few fine breeding establishments. I had the pleasure of examining horses for cleft palate, infected uteri, and for an unknown infectious hepatitis. Small animal practice is fairly well developed in modern cities such as Sao Paulo or Rio de Janeiro, Brazil.

Country cattle practice is best managed by a private veterinarian located at one ranch, an idea that is being actively promoted by several leaders in veterinary education, such as Dean Ramos Saco of Lima and Dean Outobrino Correa of the veterinary college at Porto Alegre, Brazil. Bad roads make travel to farms nearly impossible. Only horses or jeeps are practical.

The plan to send more individuals to make contacts with people south of the border should, in my opinion, in the near future include a few more veterinarians. The men in our profession in those countries admire our progressive methods; and research peo-

Pictured with the old sterile Jersey cow in the German-made stocks is a group of veterinarians interested in sterility problems, at a demonstration clinic at the veterinary college at Porto Alegre, State of Rio Grande do Sul, Brazil. At the center, facing the camera, is Dr. Mario Vieira, of the Clinic, Veterinary School of Porto Alegre. Dr. Fincher (center, wearing glasses) demonstrates sterility examination procedures.

This Holstein-Friesian bull was the first to be born in Brazil as a result of the use of frozen semen shipped to Porto Alegre from Wisconsin. The men in the picture are: Dr. Fincher (center with cap), Dr. Blauth (no cap), a veterinarian who is trying to promote the use of artificial insemination in Brazil, and Dr. Gudice (with cap, no glasses), a young progressive clinician, at the veterinary college, Porto Alegre.

ple like Dr. Trenchi of the school of veterinary medicine in Uruguay and Dr. Francisco Megale, a former graduate student of mine who teaches surgery and obstetrics at the modern plant at Belo Horizonte, Brazil, are as loyal to the United States and the principles for which it stands as are any of us.

A common statement by experienced men such as these professors was, "What we need most down here is more education and sanitation." They could have added that more good roads and railroads and an active program to eradicate disease would follow if those who controlled the budgets were educated regarding the importance of cooperation between veterinary medicine, as exemplified by veterinary practice, and the livestock industry.

South America is filled with fine people and it was a pleasure for me to make a few more friends there. They advertised my talks and my presence in farm papers and newspapers in a way that I trust helped the status of their profession and ours, too.

S/DR. M. G. FINCHER

Pullorum Eradication Subject of Special Meeting

Representatives of the AVMA, the American Poultry and Hatchery Federation, the Poultry Breeders of America, the National Poultry Improvement Plan, and the USDA, met at AVMA's central office in Chicago, Jan. 4, 1961, to formulate a program to eradicate pullorum from poultry in the United States.

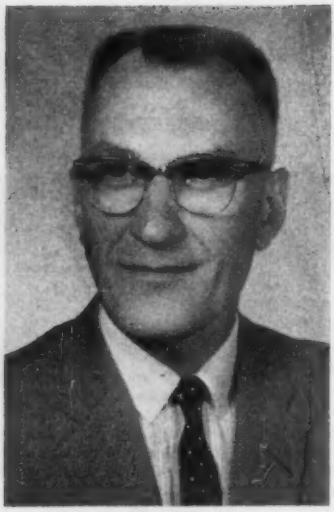
Discussing pullorum eradication plans at AVMA headquarters are (beginning at left and going around the table): Mr. Richard O'Connell, American Poultry and Hatchery Federation; Dr. B. S. Pomeroy, AVMA; Dr. George F. Godfrey, Poultry Breeders of America; Mr. Vern F. Steckley, APHF; Mr. Donald Turnbull, meeting chairman, APHF; Dr. R. E. Omohundro, USDA; Mr. Paul Zumbro, National Poultry Improvement Plan; and Dr. B. R. Burmester, AVMA. The J.A.V.M.A. news editor, in the foreground, sat in on part of the meeting.

Attending the exploratory meeting were: Mr. Donald Turnbull, chairman, Mr. Vern F. Steckley, and Mr. Richard O'Connell, American Poultry and Hatchery Federation; Dr. George F. Godfrey, Poultry Breeders of America; Mr. Paul Zumbro, National Poultry Improvement Plan; Dr. R. E. Omohundro (MO '52), Animal Disease Eradication Division, ARS, USDA; Dr. B. S. Pomeroy (ISU '33) and Dr. B. R. Burmester (MSU '51), representing the AVMA.

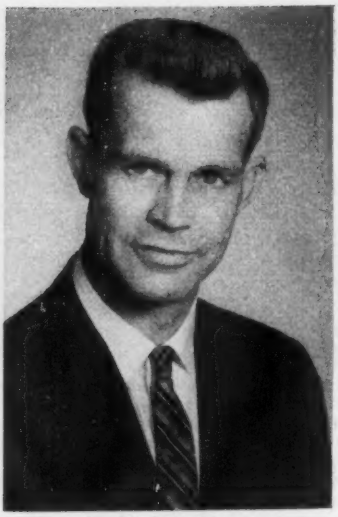
Dr. Dale Suplee Transferred to New York

Dr. Dale Suplee (KSU '31) was named veterinarian in charge, Albany, N.Y., Animal Disease Eradication Division, USDA. His appointment was effective Sept. 4, 1960. He had been veterinarian in charge at the Helena, Mont., station since 1957.

Following graduation from Kansas State University, Dr. Suplee was engaged in general veterinary practice in Kansas from 1931 to 1934. He entered federal service in Texas in 1934 and served with the Tuberculosis Eradication Division of the Bureau of Animal Industry until 1938. He was then transferred to the Idaho force where he did



Dr. Dale Suplee



Dr. Oral D. Corson

brucellosis field work and supervised the cooperative brucellosis testing laboratory. In 1947 he was assigned to brucellosis research at the Agricultural Research Center at Beltsville, Md. From April, 1949, until 1955, he was assistant veterinarian in charge of the animal disease eradication activities in West Virginia. He was appointed assistant veterinarian in charge, Olympia, Wash., in 1955. In December, 1957, he was designated veterinarian in charge at Helena, Mont.

Dr. Suplee is a member of the Montana Veterinary Medical Association.

Dr. O. D. Corson Appointed to Washington Staff

Dr. Oral D. Corson (MSU '56) was appointed assistant chief staff officer, Tuberculosis Eradication, Washington, D.C., in September, 1960. He was formerly Tuberculosis Project Leader in the State of Michigan.

Dr. Corson entered federal service in 1955 as a veterinary trainee in Michigan, and in 1956 was made area veterinarian in the state. He also served as stockyards veterinarian and relief veterinarian for the Animan Inspection and Quarantine Division. In 1957 he was appointed district supervisor. He participated in the Animal Disease Eradication Division's Sixth Veterinary Administrator Development Program, and was assigned tuberculosis project leader in Michigan until his promotion to assistant chief staff officer, Tuberculosis Eradication, Washington, D.C.

Dr. Corson is a member of the AVMA and the Upper Thumb (Mich.) V.M.A., the Michigan Tuberculosis Association, and the National Association of Federal Veterinarians.

Among the States and Provinces

Indiana

VETERINARY MEDICINE PROMOTED AT STUDENT CAREER DAY.—Veterinary medicine was a represented career at a program set up to acquaint high school students in southeastern Indiana to the various facets of medical science. The career day was held at Columbus Indiana High School Auditorium, December 7 and 8.

Two exhibits on veterinary medicine were shown. At the exhibit of the Purdue University School of Veterinary Science and Medicine various fields open to graduate veterinarians were shown. The ninth District

V.M.A. exhibit highlighted new techniques of veterinary practice.

The career day was sponsored by the Bartholomew and Brown County Medical Society.

Michigan

VETERINARIANS TO PARTICIPATE IN MAP PROGRAM.—Veterinarians will be represented at and participate on the program of the second annual Congress of the Professions in Detroit, Mich., Feb. 22-24.

The Congress is sponsored by the Michigan Association of the Professions, a two-year-old organization with 3,300 professional members. Member professions of the interprofessional organization are veterinary medicine, architecture, dentistry, engineering, medicine, law, and pharmacy. The association is dedicated to meeting the interests and problems common to all professions. MAP presents a united front for its members in four broad fields—public relations, legislation, education, and business techniques and services. It is endorsed by the state societies representing the member professions, and its board of directors is made up of officials and key persons from these societies. To become a member of MAP, the professional person must first be a member in good standing of his state society.

This year's Congress program includes speakers who will discuss the achievements, evaluation, and challenges facing the professional man. A highlight of the meeting will be the session in which each of the 7 member professions will defend, or justify, itself to the other 6.

At the meeting products used by the professional people in their work will be exhibited. There will be 4 areas of interest: medical-dental-veterinary-pharmaceutical; architectural-engineering; law-general offices; and miscellaneous areas featuring transportation, travel, and hobby equipment.

Minnesota

MINNESOTA V.M.A. ESTABLISHES PRESIDENT'S ADVISORY COUNCIL.—Minnesota's president-elect, Dr. Fred Gehrman (ONT '37), has appointed a president's advisory council.

He outlined the purpose of the council as serving a liaison between the state association and local associations. He said it will be the responsibility of the council to keep informed on state association activities in the fields of teaching, service, research, public health, and legislation, to keep the president informed of the problems, needs, and wishes of the local associations, and to keep local association's up-to-date on the activities of the state association.

Council membership will be made up of one member appointed by each component association and 6 members at large appointed by the state president to serve during his term of office. Meetings will be called throughout the year by the president whenever he feels they are necessary.

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CENTRAL MINNESOTA V.M.A. ELECTS NEW OFFICERS.—New officers elected at the meeting of the Central Minnesota V.M.A., Nov. 29, 1960 are: Drs. Leroy T. Christensen (ISU '42), Hancock, Minn., president; R. S. Kufrin (ISU '41), Benson, Minn., treasurer; and Peter E. Poss (MIN '57), Paynesville, Minn., secretary.

New Jersey

SOUTHERN NEW JERSEY V.M.A. ELECTS NEW OFFICERS.—New officers of the Southern New Jersey V.M.A. elected at the association's December meeting are: Drs. Marvin Rothman (UP '48), Collingswood, president; Robert Graham (UP '55), Cinnaminson, vice-president; Jay Simmons (UP '56), Audubon, secretary; and H. J. Terwilliger (COR '55), Marlton, treasurer.

North Carolina

PRE-VETERINARY STUDENT ENROLLMENT RISES.—A total of 43 pre-veterinary students enrolled at North Carolina State College this fall. This is the first sign of an increase in pre-veterinary enrollment at the school after a decline that lasted a number of years.

Dr. Edward G. Batte (TEX '49), head of the Veterinary Section of the Animal Industry Department attributes the rise in enrollment to the increased interest on the part of veterinarians throughout the state in getting well-qualified students to enter the profession. He has urged all veterinarians

in the state to encourage talented young people in their communities to investigate the possibilities of veterinary medicine as a career.

The student enrollment is made up of 3 seniors, 9 juniors, 15 sophomores, and 16 freshmen.

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DR. H. C. H. KERNKAMP TO BE VISITING PROFESSOR AT NORTH CAROLINA STATE COLLEGE.—Dr. H. C. H. Kernkamp (OSU '14) has accepted a visiting professorship at North Carolina State College for the 1960-1961 school year.

Dr. Kernkamp had retired last june as a veterinary pathologist at the University of Minnesota, College of Veterinary Medicine, after 46 years of service. At North Carolina State College he will teach and perform research in the Veterinary Section, Department of Animal Industry. He succeeds Dr. J. C. Osborne (MSU '49), who is on a leave of absence to do postdoctoral work at Duke University.

When Dr. Kernkamp moves, so does Chester White

Chester White says of Dr. Kernkamp's move: "He is enjoying his work here in the Tarheel state. He is here as a visiting professor and expects to be here until July. After that he is going to load us all in the Plymouth again and take us back to Gopherland. Since coming here the boss and I have been in Zurich, Rome, Tunis, Algeria, Lisbon, and Madrid. He took part in the 2nd International Conference on Animal Nutrition.

"I think you should know that it wasn't easy for the old boy to shut the door on an office and laboratory where he lived, labored and loved for nigh on to 46 years."

Ohio

CUYAHOGA COUNTY V.M.A. CONTRIBUTES TO AVMA RESEARCH FUND.—After a treasury report at their last meeting Dec. 7, 1960, the Cuyahoga County V.M.A. voted to contribute $60 to the AVMA Research Fund.

Tennessee

DR. C. E. KORD NAMED 1960 MAN OF YEAR IN SERVICE TO AGRICULTURE.—Tennessee State Veterinarian Dr. C. E. Kord (TH '12) has been named "1960 Man of the Year in Tennessee Agriculture" by the *Progressive Farmer* magazine.

Dr. Kord was selected for the honor by the magazine "for assistance rendered to Tennessee agriculture, and especially to farmers in checking and controlling livestock and poultry diseases."

Under his direction, Tennessee became the first southern state to be modified-certified brucellosis-free in a national accelerated program. Dr. Kord also directed the establishment of the state's new Animal Disease Diagnostic Laboratory at Nashville. Services of the center are available to all state livestock men.

Dr. Kord has been Tennessee's state veterinarian since 1941. He has worked principally on tick eradication, hog cholera control, and tuberculosis eradication. At one time he was a practicing veterinarian.

In 1948, he was among a group of veterinarians who went to Mexico during an epizootic of foot-and-mouth disease. He has drawn up state laws on livestock auctions, cooking garbage for hog feeding, and branding cattle.

Virginia

SOUTHWEST VIRGINIA V.M.A. ELECTS 1961 OFFICERS.—Southwest Virginia V.M.A. 1961 officers were elected at the Jan. 5, 1961, meeting of the association at the Veterinary Science Laboratory in Blacksburg. They are: Drs. Roy Smith (GA '54), Lebanon, presi-

dent; William Crutchfield (UP '42), Roanoke, vice-president; and D. F. Watson (UP '37), Blacksburg, secretary-treasurer.

Mr. Sumpter Priddy, new executive secretary of the Virginia V.M.A., explained the function of his office and offered assistance to the local association.

Dr. Lewis Springer (TEX '54) spoke to the group about raising laboratory animals. Dr. Springer has operated a business which has supplied large numbers of disease-free mice to research organizations in the eastern United States for several years. He described methods used and equipment and food needed to produce large numbers of the mice.

Veterinary Military News

Retiring Army Veterinarian Accepts Position in Pakistan

Colonel William Dieterich (KSU '39), Fourth Army Medical Laboratory Veterinarian at Fort Sam Houston, Texas, moved to Mymemsingh, Pakistan, after his retirement in December following 20 years of Army service.

Colonel Dieterich will become consultant to the dean of the College of Veterinary Science and Animal Husbandry at the University of Dacca, East Pakistan. His wife and 2 sons will live there with him.

The 44-year-old Colonel has spent 21 years in the Orient and South Pacific. He was born in Nanking, China, where his parents were missionaries. His father taught at Nanking University, and his mother at a girls' school in Chinkiang. He attended grade school in Nanking, and a year of junior high school in Tokyo, Japan. Then his family returned to the United States and he completed his high school and university education in Kansas.

Colonel Dieterich entered the Army at Fort Jackson, S.C., and during World War II was the first Army veterinarian in New

Members of the second Veterinary Officer Basic Class, U.S. Army Medical Service Meat and Dairy Hygiene School are: Back row left to right—First Lieutenants Clyde S. Street, Richard K. Johnson, Billy M. Muirhead, Max A. Hughes, John D. Coleman, Captain Charles C. King, Jr, and First Lt. Lionel C. Ickes. Second row left to right—First Lieutenants Roger M. Gardner, Dwight B. Coulter, Jerry A. Hemphill, Richard E. Wooley, John R. Lomme, Robert E. Reichard, and James E. Mahler. Front row left to right—Major Buford F. Bridges, instructor; Major William A. Bridenstine, director of training; Lt. Col. Morris D. Schneider, instructor; Col. Nels F. Christenson, commandant; Lt. Col. Donald E. Guy, instructor; Major Samuel K. Kirk, instructor; Major Daniel W. Hubbard, instructor; and Captain James C. Kepp, instructor.

Colonel William Dieterich

Guinea. He was also assigned to Australia with the Army Remount Station at Townsville, where he was in charge of preparing thousands of horses for military use. He then went to Burma and took charge of transporting and treating horses for the Chinese forces fighting against the Japanese.

After World War II, Colonel Dieterich organized the College of Veterinary Medicine in Seoul National University for the Korean government. He went to Fort Sam Houston from Schofield Barracks, Hawaii, where he was officer in charge of the Hawaiian Medical Laboratory. While there, he had pioneered in the tissue-culture field of diagnosing and identifying viral agents in man. He was also one of the first Army scientists to use the fluorescent antibody technique to detect rabies in man and animals. One of his recent notable accomplishments was the vaccinating of Army and Air Force animal handlers with a new type of anti-rabies vaccine.

Report on Food for Spaceman Completed by Veterinarian

"Food for Space Travel," a book-form report, has just been completed by Lt. Col. Albert A. Taylor (WSU '37), Air Force bioastronautics food expert.

The report gives primary consideration to the spaceman and presents a complete program for providing food and water for manned space flights of durations of 3 days to several months.

Colonel Taylor is chief of the Biomedical Division, Directorate of Life Sciences. Headquarters Air Research and Development Command, Washington, D.C.

Deaths

Star indicates member of AVMA

★**Wallace J. Flynn** (WSU '33), 50, Nootka Island, B.C., died Sept. 16, 1960, of a heart attack.

Dr. Flynn had been known in his area as a "flying veterinarian." He had learned to fly in 1949 and flew all over southeastern Alaska on veterinary work. He was a member of the AVMA, and the British Columbia and Canadian V.M.A.'s. His brother, Dr. John Flynn (WSU '44) Farmington, N.M., is also a veterinarian.

★ **Herbert Howard** (CVC '17), 70, of Middleburg, Va., died Nov. 27, 1960, following a heart attack.

Dr. Howard had practiced in Loudoun county for 37 years. He had lived in Leesburg until two years ago when he moved to Middleburg. He had been a member of the AVMA and the Virginia V.M.A. He is the father of five sons and a daughter. Two of his sons, Dr. Herbert Howard, Jr. (AUB '43 and Dr. Thomas J. Howard (AUB '55) are also veterinarians.

★**Harold G. Hoyt** (ISU '34), 51, of West Dundee, Ill., died Nov. 5, 1960.

Dr. Hoyt had been Kane County veterinarian since 1957.

George E. Martin (KVC '10), 73, a retired veterinarian and funeral home director from

Altamont, Kan., died Oct. 31, 1960, of a heart attack.

Dr. Martin, who had practiced veterinary medicine in Altamont for 47 years, retired two years ago.

Dr. Martin had been a member of the Kansas V.M.A.

Robert W. Merriman (ISU '23), 59, Los Banos, Calif., died Nov. 13, 1960, of lung cancer.

Dr. Merriman had entered the Illinois Division of Livestock Industry and was employed as the veterinarian in charge of St. Louis National Stockyards until 1933. He joined the Bureau of Animal Industry and the Animal Disease Eradication Division of USDA in 1934. After an initial assignment on tuberculosis eradication in Texas, he returned to brucellosis control work in Illinois. In 1952 he transferred to California and was promoted to district veterinarian in 1955.

Dr. Merriman was a member of the Northern San Joaquin Valley V.M.A., the National Association of Federal Veterinarians, and the U.S. Livestock Sanitary Association. He had received the USDA Award of Merit Certificate for outstanding performance in 1958.

Clifford A. Merritt (COR '23), 58, Walden, N.Y., died Nov. 5, 1960.

Dr. Merritt had been a member of the Hudson Valley Veterinary Medical Association.

★**Cecil Moulton** (SF '18), 77 a retired veterinarian of Petaluma, Calif., died Oct. 20, 1960.

Dr. Moulton, a native of Lancaster, England, became assistant veterinarian at Fresno immediately following graduation. Several years later he established his own practice in Larkspur. In 1933 he was appointed meat inspector for the state of California. He had retired in 1952.

Dr. Moulton became a life member of the AVMA in 1955.

★**Charles E. Palmer** (CIN '14), 71, Shelbyville, Ky., died Oct. 30, 1960.

Dr. Palmer had practiced in Shelbyville since 1919. He had served on the Kentucky Board of Veterinary Examiners for 30 years.

He was made a life member of the AVMA in 1954. Dr. Palmer was a charter member of the Jefferson County V.M.A., and a past-president and life member of the Kentucky V.M.A.

Delbert L. Schantol (STJ '20), 73, a retired veterinarian, died Oct. 31,, 1960.

Dr. Schantol had practiced in Orient, Iowa, for many years. He retired when his health failed.

Daniel G. Shumway (UP '96), 86, Rouses Point, N.Y., died Oct. 17, 1960.

Dr. Shumway had retired from service with the Animal Inspection and Quarantine Division, USDA, in 1943, after 44 years of service.

Henry G. Thompson (MCK '06), Davenport, Iowa, died Oct. 23, 1960.

Dr. Thompson had practiced in the Davenport area since 1909.

★**Irving R. Vail** (COR '11), 71, Bristol, Conn., died Nov. 7, 1960.

Dr. Vail had been city veterinarian for Bristol until his retirement in 1958. His son, Dr. John I. Vail (COR '43), also a veterinarian, succeeded him in this post.

Harry M. Williams (KVC '11), 75, died Nov. 7, 1960, following a cerebral hemorrhage.

For a number of years, Dr. Williams had served as a federal veterinarian at Caldwell, Idaho. More recently he had been employed by the state of Idaho as a meat inspector at Pocatello.

Women's Auxiliary

Student Auxiliary Members—An Asset to the Veterinary Profession

Each June more than 1,000 young men receive their degrees from the 20 veterinary colleges in North America and assume their responsibilities as doctors of veterinary medicine. We are proud of these young men and grateful for the new energy and wisdom which they bring to the profession each year.

There is also a group of young women of whom the Women's Auxiliary is especially proud—these are the wives of the young graduates who have shared their husbands' college years. These girls have, in their own way, been working just as hard as their student-husbands. In most cases, they have been contributing financially to the support of their families. At the same time, they have been learning to be good helpmates to their husbands after graduation. These are the members of the student auxiliaries—the auxiliaries to the student chapters of the AVMA.

Student auxiliaries are a constituent of the Women's Auxiliary to the AVMA and work closely with the parent organization. However, they conduct their own business and carry out a planned program of study courses, service projects, and community service activities which are a great asset to the auxiliary and the veterinary profession.

Student auxiliary educational classes have included such topics as veterinary terminology, professional ethics, surgical demonstrations, office techniques, bookkeeping, the use and care of instruments, sterilization of instruments, law pertaining to veterinary practice, and hematology. One school heard a lecture by the veterinary college dean entitled "Doctor, Your Wife is Showing."

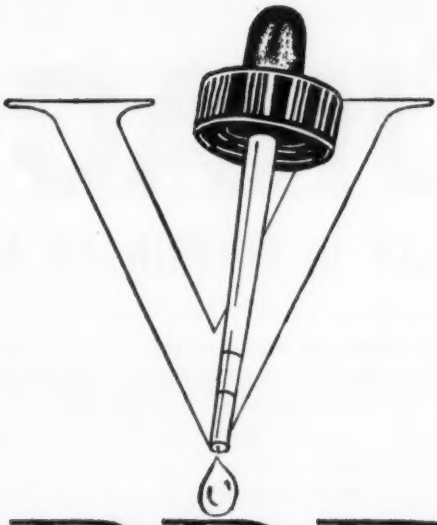
Student auxiliary service programs have included such items as providing an intercommunication system for the veterinary college, textbooks for the veterinary library, motion picture screens for visual class study, laparotomy drapes for veterinary clinics, draperies for classrooms, and physical and financial assistance to students in distress. They have also made contributions to the student loan funds of their schools and the AVMA. Each year student auxiliaries send delegates to the Women's Auxiliary to the AVMA conventions.

The student-wives perform community services, too. They have assisted local health projects, such as cancer society programs, infantile paralysis society programs, heart funds, muscular dystrophy funds, and mental health campaigns. Some student auxiliaries have adopted needy families in their community and have supplied toys, gifts, and even clothes to the children in schools for the homeless and mentally handicapped. They have supplied books to local libraries and Easter baskets to underprivileged children.

Besides all of this they find time for a social program. They are bound together by a common interest—the veterinary profession. They are all looking forward to joining the thousands of veterinary families in the nation after graduation.

The Women's Auxiliary to the AVMA salutes these young women of the student auxiliaries who are part of the foundation of the future of the profession. We feel sure we shall never have to worry about the future of our Auxiliary as long as we have young women such as these "graduating" each year.

s/Mrs. George Dorney, *Vice-President for Student Auxiliaries*



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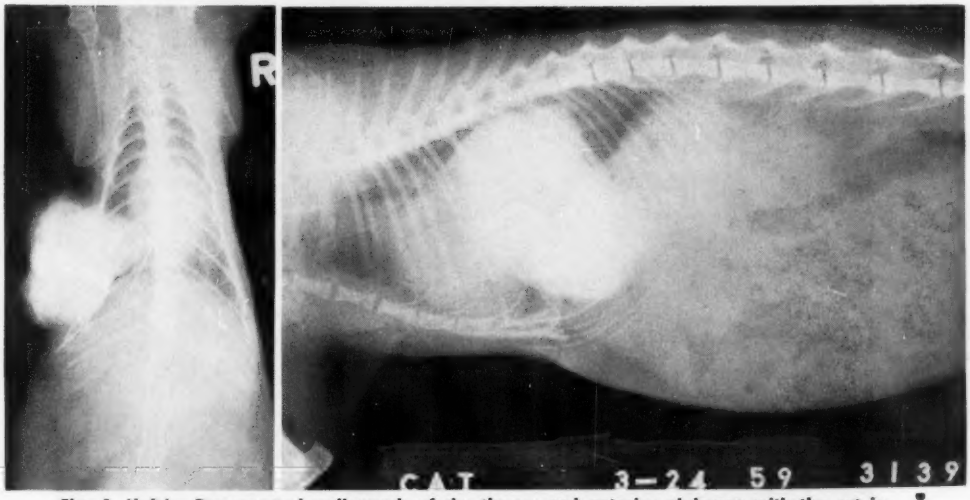

Fig. 1 (left)—Dorsoventral radiograph of the thorax and anterior abdomen with the cat in ventral recumbency.

Fig. 2 (right)—Lateral radiograph of the thorax and abdomen, with the patient in right lateral recumbency.

History.—A short-haired female cat, middle-aged and tricolored, was examined because of a large, hard, irregular, nodular mass, 5 cm. in diameter, attached to ribs 8, 9, and 10 on the left side. The skin over the lesion was normal and not adherent to the mass. Routine laboratory test results were within normal limits. A complete history was not available, but after 8 months there was no visible change in the size of the lesion or in the state of health. Dorsoventral and lateral radiographs of the cat were taken (fig. 1 and 2).

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis. — Solitary osteocartilaginous exostosis (osteochondroma).

Comment.—At necropsy, it was found that the lesion (fig. 3) occurred on the 9th rib and encircled but did not invade the 8th and 10th ribs. It was removed for histologic study. The lesion consisted of cancellous bone covered by hyaline cartilage. The normal-appearing trabeculae and the spaces between contained active and fatty marrow (fig. 4).

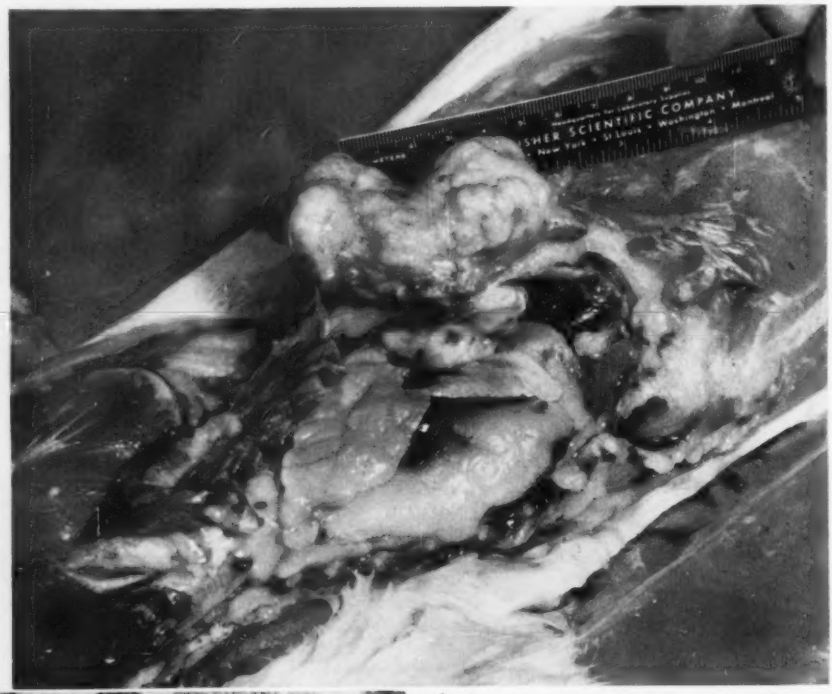

Fig. 3 (above)—Photograph of cat at necropsy, showing the irregular osseous lesion attached to the left 8th, 9th, and 10th ribs. Notice that the lesion also extends through the rib cage.

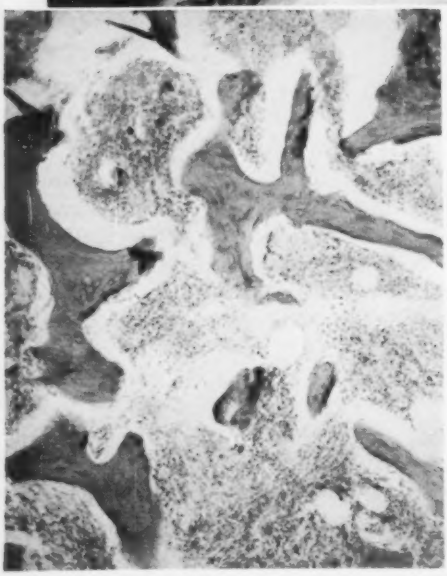

Fig. 4 (left)—Photomicrograph of a portion of the radiopaque mass showing normal cancellous bone and normal bone marrow. x 80.

Continued on adv. p. 30

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Here is the Diagnosis

(*Continued from adv. p. 28*)

Solitary osteochondroma in man is one of the more common bone lesions. In lower animals, it probably occurs more often than is realized because it is slow growing and usually goes undisturbed and unidentified. It occurs as a cartilage-capped osseous projection that usually originates in the area of the epiphysis of long bones. It rarely becomes malignant and probably originates from tags of ossifying cartilage that have been left behind by defective absorption in that area of the metaphysis just below the growth plate where the bone narrows. In general, the osteocartilaginous exostosis takes the form of a stalked or sessile protuberance jutting from the cortex of the bone. If the protuberance is allowed to grow, it may entirely surround the shaft of the bone, as it did on the ribs of this cat (fig. 3).

Histologically, the mass is covered by a layer of periosteum which is continuous with that covering the adjacent cortex. Directly beneath the periosteum is a cap of poorly differentiated hyaline cartilage. If the lesion is a stalked one, cartilage is found on the cap and the rest of the stalk is cancellous bone. The osseous tissue has the normal appearance of cancellous bone with fatty bone marrow situated between the trabeculae.

Radiographically, the contour of the exostosis is usually sharply demarcated; if large, it is dense, with a pronounced blotchy pattern. Rarely, such a lesion becomes a chondrosarcoma.

This case report was submitted by Dr. Lionel F. Rubin, Animal Hospital Section, Laboratory Aids Branch, Division of Research Services, National Institutes of Health, Bethesda 14, Md. Necropsy and histopathologic study are credited to Dr. Roy F. Kinard, Comparative Pathology Section, Division of Research Services, National Institutes of Health. The report was prepared with the assistance of Wayne H. Riser, D.V.M., M.S., Kensington, Md.

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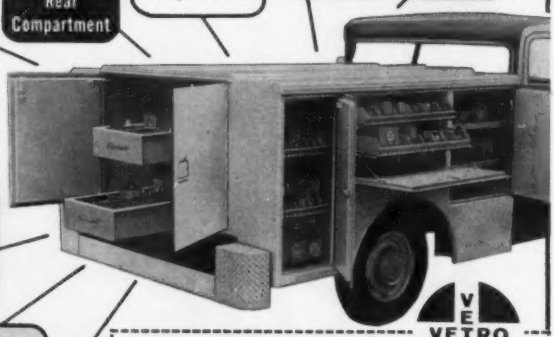

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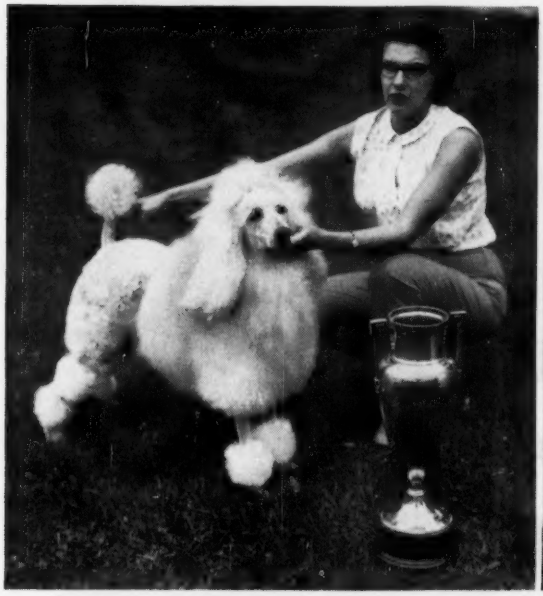

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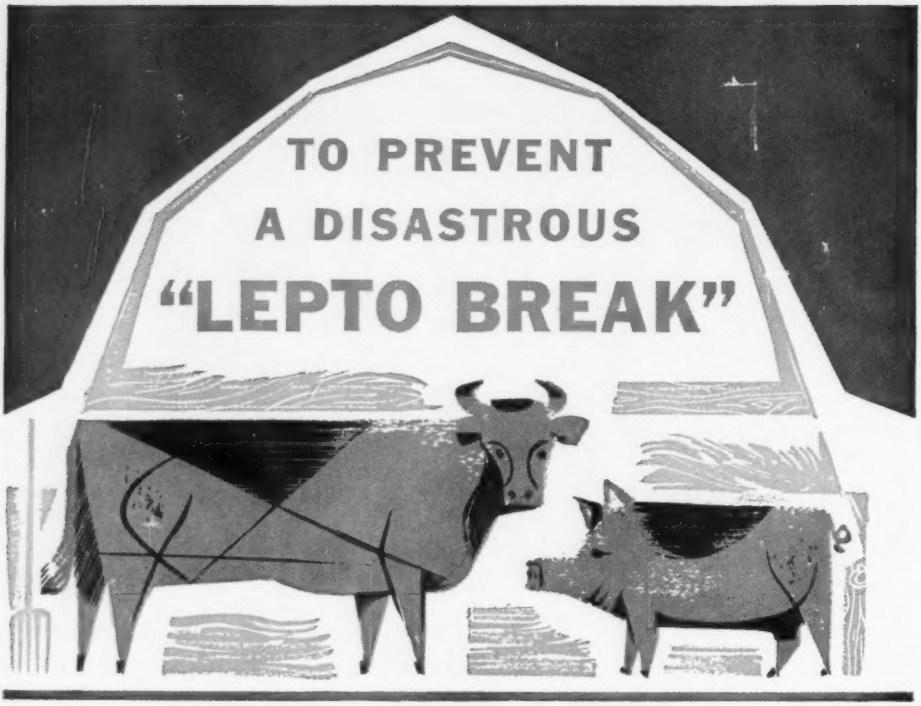

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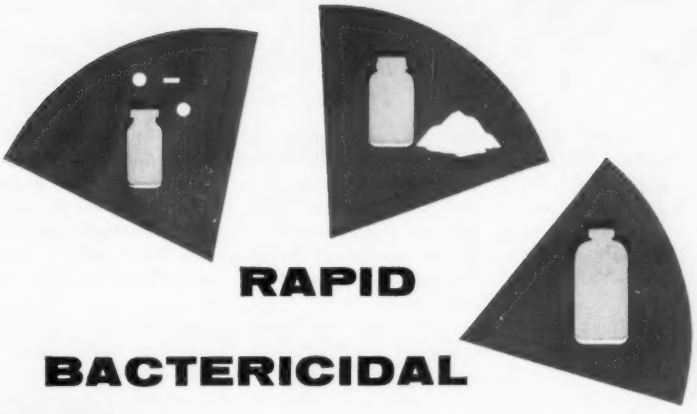

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History of the AVMA

1904

The 1904 annual meeting was held in St. Louis at the time of the World's Exposition. In his presidential address, Roscoe R. Bell noted that the prosperity being experienced by the veterinary profession was not due to "boom times," but to: ". . . the quality of the practitioner himself, which has inspired the owner of livestock with greater confidence in his ability to render valuable services, not only in the treatment of the diseases from which animals suffer, but . . . sanitation, particularly for the eradication and prevention of those animal scourges which destroy the herds and flocks of livestock breeders and owners."

In a provocative discussion on "When to Operate," L. A. Merillat noted the dearth of so-called "popular papers" presented at the meetings, and observed, "The capable writer, finding it distasteful to present a paper here that does not compare favorably, from a scientific standpoint, with those which delve deeply into the realms of mystery and are adorned throughout with high-sounding technical terms, leaves the task alone and comes to the meetings year after year to hear only the year's revelations of the field and laboratory. He goes home proud enough of the progress of his profession, but without additional knowledge as to his daily vocation."

Dr. Merillat concluded his lengthy argument with a condemnation of the AVMA clinics as being "not a fair presentation of the highest standard of American veterinary surgery . . . they should be abandoned or conducted on entirely different lines. . . . The member of this Association who is incapable of performing this or that operation will add nothing to his deficiency by occupying a seat at these exercises. They excite the greatest curiosity, but they do not instruct the unlearned."

Dr. Morton E. Knowles

At the clinical session, 14 cases were presented (none by Dr. Merillat); of these, one at least should have been exempted from Merillat's wrath — a demonstration of insertion of the stomach tube by G. R. White. This was something which undoubtedly most of those present had not seen done. But considering the facilities for a crowd of perhaps 200, some doubt may be cast upon the educational value of certain other demonstrations. These included quittor operation (40 minutes), two standing castrations (15 seconds and 8 seconds), roaring operation (30 minutes), vaginal ovariotomy, intestinal anastomosis in a dog, and diagnosis and prescription for 6 lame horses. However, "It was generally conceded that this was altogether the most satisfactory clinic held. . . ."

At the 1906 clinic there were no less than six roaring operations and two quittors. As in previous years, this was "the best clinic that had yet been staged." Perhaps it was, but it might be doubted that six roaring operations could be considered as more than an opportunity for six men to prove their prowess, with little opportunity of its being disproved. And while "practical" papers had been, and continued to be, presented, surgeons had to be contented, for the most part, with reports that were non-surgical until the meetings were sectioned in 1910.

M. E. Knowles was elected president, J. J. Repp and W. H. Lowe were re-elected secretary and treasurer, respectively.

✦ ✦ ✦

MORTON EDMUND KNOWLES, D.V.S., was born at Clinton, Iowa, on April 24, 1862. After being graduated from De Pauw University, he entered the American Veterinary College and was graduated in 1884. He was state veterinarian of Indiana from 1886 to 1892 and of Montana from 1892 to 1913. Commissioned a second lieutenant in the Veterinary Corps in 1917, he rose to the rank of major, and served as chief veterinarian on the staff of General Pershing. Merillat and Campbell said ". . . but for the efficiency of Major Knowles at the evacuation stations . . . the operation of the Veterinary Corps . . . would have broken down completely."

Dr. Knowles joined the Association in 1891, was a vice-president from 1900 to 1904, and was elected president in 1904. He also served as president of the Montana V.M.A. He died June 16, 1923.

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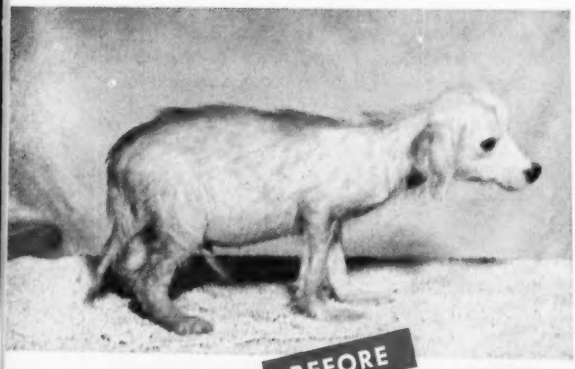

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1. "Clinical Evaluation of a Drug for Dermatoses of Dogs and Cats," Wenger, J. B., Vet. Med., 55:55-58, Mar. 1960.

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COUNCIL REPORT

AVMA Council on Education

Continuing Veterinary Education in the United States and Canada

Preliminary Report of a Survey

In its efforts to assure the livestock industry and the public of high standards of veterinary care, the American Veterinary Medical Association has charged its Council on Education with the responsibility of aiding in the development and maintenance of high standards of veterinary education in all its phases.

The Council recognizes that one of the most important factors in maintaining high standards of veterinary care is the continuing education of the veterinarian throughout his professional career. The rapid advances in all phases of veterinary medicine can be made available to the livestock industry and to the public only through the continuing education of practicing veterinarians and those engaged in regulatory and public health work.

That there is a recognized need and demand for a program of continuing education is indicated by the increasing number of local veterinary associations and veterinary schools that have initiated concentrated specialty and refresher short courses of some kind. This increasing interest in and need for postgraduate veterinary education led the Council to undertake a survey of activities in this field in the United States and Canada. The report of this survey is preliminary. Further evaluation and surveys are anticipated. It is hoped, then, that the preparation of a full report will serve as a reference and guide to those who are eager to enter this field and as a further aid to those institutions and associations who are seeking to improve the quality of programs already existing.

Continuing education questionnaires were sent to the 20 veterinary schools and to 273 local associations in the United States and Canada. Of these, 18 schools and 125 associations responded.

Veterinary Schools

In addition to their regularly scheduled annual conferences, 13 veterinary schools offer one or more individual postgraduate courses one or more times a year. Responsibility for this program is assumed either by an individual, special short course committee, or the extension department. Concentrated courses offered are from one day to one week in duration. Intermittent courses offered are usually 1- or 2-hour night sessions for as long as 17 weeks.

In most instances, the courses are given by the faculty members of the respective schools, but in several instances practitioner-specialists and teachers from other schools are brought in to either conduct or augment the instruction in a particular course.

The fee for participants depends upon the duration of the course, but it ranges from nothing to $125 for a 4-day course. The average fee charged ranges from $50 to $75 or about $15 per day. The number of veterinarians taking the courses ranges from 6 to 30, with an average class of 15.

Eligibility requirements for taking courses offered by the schools include a veterinary degree in all instances. One school also requires the registrant to be a member in good standing in his local, state, and national associations. Another school stipulates that he must have been graduated more than 10 and less than 20 years ago. Still another prefers that the registrant have at least 5 years of practice experience.

The mechanics of informing and securing registrants is varied and includes journal announcements, restricted invitations, letters to practitioners within the state and surrounding states, and announcements at meetings; in one instance, registrants were accepted only following selection by the local veterinary association they represented.

The schools offering courses indicated that courses need to be offered more frequently and cover a wider range of subjects. They say there is a need for repetition of certain

(Continued on adv. p. 42)

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AVMA Council on Education

(Continued from adv. p. 40)

specialty courses, but that a larger staff will be needed to carry out these programs. They want to know more about programs in other schools and would welcome suggestions from practitioners as to the type of course they want offered.

Local Associations

Of those responding, 13 local associations said they have had postgraduate courses. The majority have a permanent continuing education program with individuals or committees within the association responsible. More than half of those local associations are located on the eastern and southeastern seaboard; most of the remainder are in the Midwest.

Five associations have been offering courses once each year. Two have courses twice a year. Two others offer courses 4 times a year. One association has had but 2 courses in the past 5 years, whereas the remainder plan courses according to "supply and demand."

Courses offered in the past cover a variety of large and small animal subjects, but the small animal offerings far surpassed those offered in large animal medicine and surgery. Courses were offered on a concentrated basis of from 1 to 4 days, or on an intermittent weekly or twice-a-month schedule, with sessions of from 1 to 4 hours over 6 to 10 session periods.

The fees reported ranged from nothing to $75 depending upon the length of the course. An average was about $15 per day. The number taking a course ranged from 12 to 100, an average class about 20.

Physical facilities utilized by local associations included hotel rooms, animal hospitals, university or government lecture rooms and laboratories, lecture rooms of pharmaceutical firms, and the facilities of a graduate school of medicine. The fees charged for use of these facilities ranged from nothing to $300. The latter figure included lecture room, laboratory with instruments and attendants, experimental animals, projection equipment and a projectionist, and closed circuit television if desired.

Prospective course participants were notified by means of postcards, announcements

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at meetings, notices in bulletins, and general mailing to members and those believed interested. Eligibility included, in all instances, a degree in veterinary medicine and membership in the local association, but nonmembers were accepted if the course limit was not filled with members.

Comments offered on the returned questionnaires indicate that veterinarians have come to recognize the importance of formal postgraduate study and that they are most anxious for the program to be enlarged. Local associations generally have more applicants than they can satisfy and are pleased with the membership response. Those associations that have had a formal postgraduate education program for some time feel that a concentrated course extending over several days is more desirable than intermittent weekly sessions. Having utilized the services of both veterinarians and physicians, they also feel that veterinary instructors better satisfy their needs.

Those responding associations that are without a postgraduate education program indicated an almost 100% interest in learning more about this type of program and how it might be expanded to include their membership. The general consensus was that practitioners are in critical need of more and longer postgraduate courses.

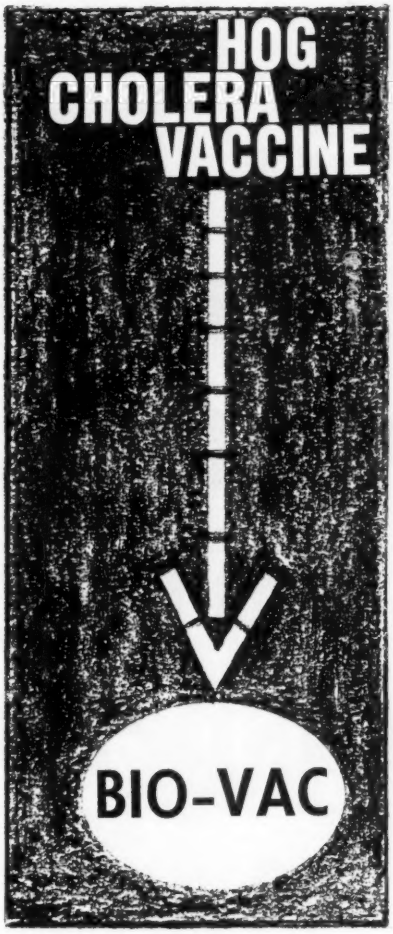
Committee on Academic Affairs of the Council on Education

DR. W. G. MAGRANE, *Chairman*
DR. H. J. STAFSETH
DR. N. W. PIEPER
DR. C. K. MINGLE

Dow Chemical Acquires Allied Laboratories

Allied Laboratories, Inc., parent firm of Pitman-Moore Company of Indianapolis, has become part of the Dow Chemical Company. Under the plan, 533,116 shares of common stock will be issued to Allied and the latter will distribute Dow stock to its stockholders on the basis of two-thirds of a share of Dow stock for each share of Allied. A total of 799,674 shares of Allied common stock now owned by stockholders will be surrendered to Dow in exchange for Dow shares.

Allied will continue to operate under its present officers as a division of Dow. No change in personnel or in operating plan of Allied is contemplated by Dow.



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It supplies broad-spectrum effectiveness against diseases caused by gram-negative and gram-positive bacteria, as well as rickettsiae, spirochetes and certain large viruses.

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Coming Meetings

Notices of coming meetings must be received 30 days before date of publication.

February, 1961

Virginia Veterinary Medical Association. Winter Meeting. Hotel Roanoke, Roanoke, Va., Feb. 19-21, 1961. Mr. Sumpter Priddy, Hotel Richmond, Ninth & Grace Sts., Richmond, Va., executive secretary.

Missouri Veterinary Medical Association. Sixty-ninth annual meeting. Hotel Statler-Hilton, St. Louis, Mo., Feb. 19-21, 1961. Paul L. Spencer, D.V.M., P.O. Box 283, Jefferson City, Mo., secretary.

Illinois State Veterinary Medical Association. Annual meeting. LaSalle Hotel, Chicago, Ill., Feb. 20-22, 1961. Dr. C. B. Hostetler, 1385 Whitcomb Avenue, Des Plaines, Illinois, executive secretary.

Manitoba Veterinary Medical Association. Winnipeg, Manitoba, Feb. 27-28, 1961. Dr. K. Warren, Killorney, Manitoba, secretary.

Dr. E. C. Jones Made Chairman of the Board at Norden

Dr. E. C. Jones (KSU '16), has resigned as president of Norden Laboratories, Omaha, Neb., to become chairman of the board.

Dr. E. C. Jones

Lewis E. Harris, 50, will replace Dr. Jones as president of the pharmaceutical firm.

Dr. Jones was awarded a distinguished service citation from Kansas State University in 1958 in recognition of his contributions to the field of veterinary medicine.

March, 1961

Alabama Veterinary Medical Association. Annual meeting. Whitley Hotel, Montgomery, Ala., March 19-21, 1961. Dr. M. K. Heath, School of Veterinary Medicine, Auburn, Ala., secretary.

April, 1961

Ohio Academy of Science. Annual meeting. University of Cincinnati, Cincinnati, Ohio, April 20-22, 1961. Mr. Kenneth B. Hobbs, 505 King Ave., Columbus 1, Ohio, executive secretary.

Animal Health Institute. 21st annual meeting. Mayflower Hotel, Washington, D.C., April 24-26, 1961. Dr. Guy A. Railsback, Cutter Laboratories, 4th & Parker Sts., Berkeley 10, Calif., president.

Southwestern Conference on Diseases in Nature Transmissible to Man. Eleventh annual conference Agricultural and Mechanical College of Texas, Memorial Student Center, College Station, Texas, April 27-28, 1961. Dr. F. P. Jaggi, Jr., Department of Veterinary Public Health, Agricultural and Mechanical College of Texas, College Station, Texas, conference chairman.

June, 1961

Pennsylvania Veterinary Medical Association. Annual convention. Pennsylvania State University, State College, Pa., June 13-15, 1961. Dr. Richard C. Guise, 5399 Jonestown Rd., Harrisburg, Pa., president.

Maritime Veterinary Associations. Twelfth annual joint conference. Mount Allison University, Sackville, N.B., June 27-29, 1961. Dr. R. McG. Archibald, P. O. Box 310, Sackville, N.B., Can.

Nebraska, University of. Swine Repopulation Conference. Veterinary Science Department, University of Nebraska, Lincoln, Neb., June 28-29, 1961. Dr. Crosby Howe, Department of Veterinary Science, University of Nebraska, Agricultural Experiment Station, Lincoln 3, Neb., chairman.

August, 1961

American Veterinary Medical Association. Ninety-eighth annual meeting. Sheraton-Cadillac Hotel, Detroit, Mich., Aug. 21-24, 1961. Dr. H. E. Kingman, Jr., 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Foreign Meetings

Fourth International Congress on Animal Reproduction. The Hague, Netherlands, June 5-9, 1961. For additional information contact: the Secretariat of the Fourth International Congress on Animal Reproduction, 14, Burgemeester de Monchyplein, The Hague, Netherlands, Dr. L. Hoedemaker, secretary to the organizing committee.

Eighth International Congress of Animal Husbandry. Hamburg, Germany, June 13, 1961.

Twelfth World's Poultry Congress. Show Grounds of the New South Wales Royal Agricultural Society, Sydney, Australia, Aug. 13-18, 1962. Dr. Cliff D. Carpenter, chairman, U.S. Participation Committee, 1207 Emerald Bay, Laguna Beach, Calif.; Dr. A. William Jasper, secretary, c/o AFBF, 2300 Merchandise Mart, Chicago 54, Ill.

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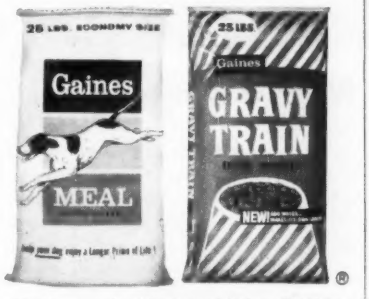

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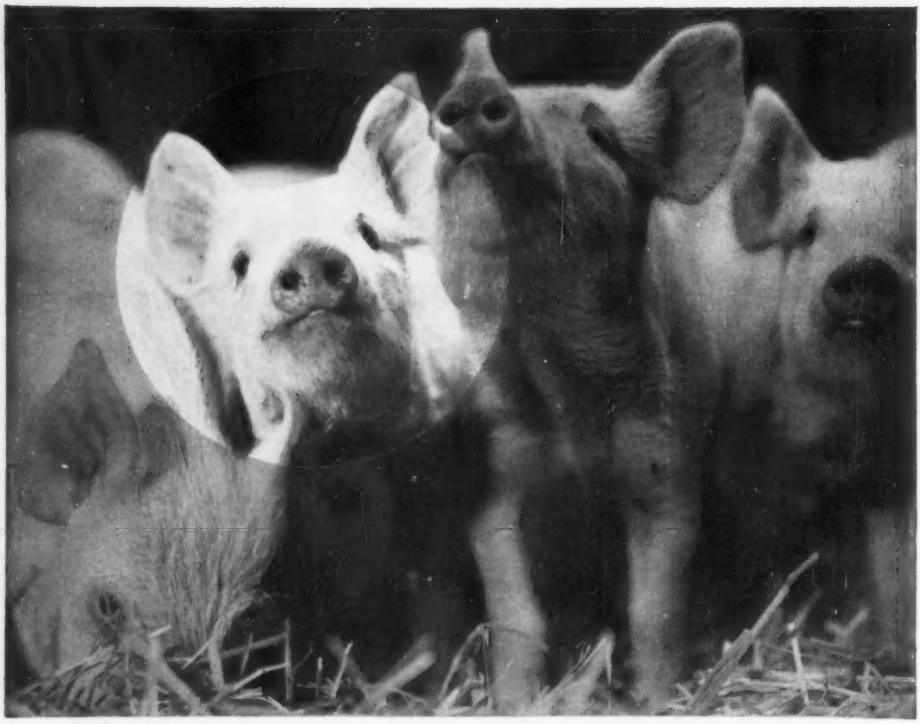

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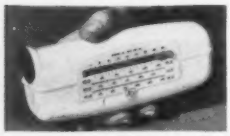

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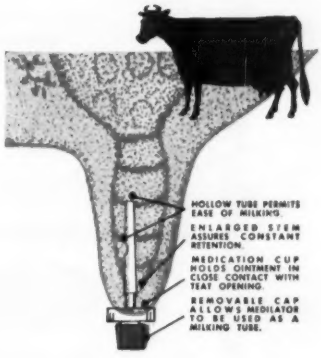
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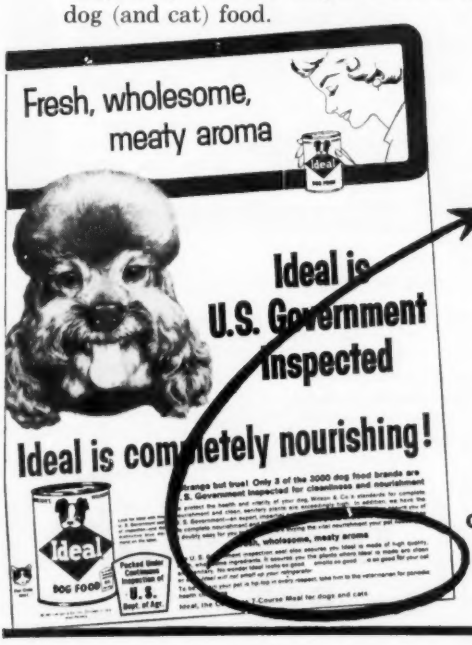

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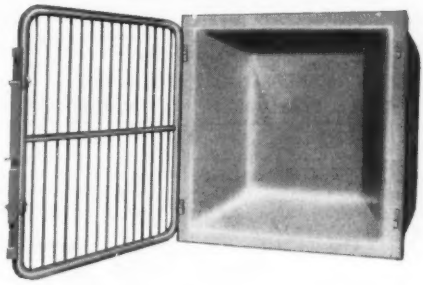

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Wanted—pups with cleft palate or parent dogs of such pups, for study of cause and treatment of human cleft palate. Address Dr. R. Dean or Dr. John Kelleher, c/o Mercy Hospital, 2221 Madison Ave., Toledo 2, Ohio, or call collect CH 8-6428, Toledo, Ohio.

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Index to Advertisers

Abbott Laboratories
Erythrocin Injectable 14, 15
Affiliated Laboratories, Inc.
Erysipelas Serum and Vaccine 11
American Cyanamid Co. 33
American Optical Co.
Hb Meter 48
American Sterilizer Co. 13
Armour Pharmaceutical Co.
L-Povac 34
FSH-p, P.L.H., P.O.P. 35
Arnold Laboratories
B. H. Mange Treatment 6
Bio Laboratories
Hog Cholera Vaccine 43
Bi-Vet Laboratories, Inc.
Medilators 49
Colorado Serum Company
Diagnostic services 6
Corn States Laboratories
Tempacine ..... 2nd cover
Eaton Laboratories
Furacin 16, 17, 29
Entefur 26
Ford Kennels, Inc. 56
Fort Dodge Laboratories
M.L.V. 5
Biotized Bacterins 24
Gaines—General Foods Corp.
Gaines Meal, Gravy Train 47
Greyhound Corporation
Package express service 53
Jensen-Salsbery Laboratories, Inc.
Cytogen ..... 4th cover
Ken-L-Biskit—Quaker Oats Co. 31
Kirschner Manufacturing Co.
Animal cages 55
Massengill, S. E. Co.
Daribiotic 37
National Laboratories
Copron 12 17
Norden Laboratories
Norvac 1
Parke-Davis and Co.
Abdec drops 25
Parlam Corporation
Sebumsol 20
Pfizer Laboratories
Liquamycin 22, 23
Cosa-Terramycin 44, 45
Pitman-Moore Company
Tissuvax 3
Globulon ..... 3rd cover
Profexray, Inc. 41
Reading Body Works, Inc.
Vetro Body 30
Research Laboratories
Pasture Plus 21
Sani-Cage Distributing Co.
Animal cages 42
Schering Corporation
Fulvicin, Fulvidex 32
Schueler and Company
Medi-Sprays 50
Standard Brands
Hunt Club Burgerbits 52
Swift and Co.
Pard 7
Vitamineral Products Co.
Ribad II, Con-o-mineral 36
Warren-Teed Products Company
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Wilson and Co., Inc.
Ideal dog food 51
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Sparine 16

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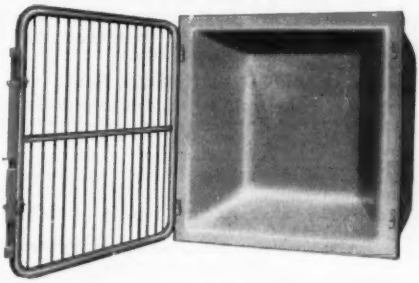

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Index to Advertisers

Abbott Laboratories
Erythrocin Injectable 14, 15
Affiliated Laboratories, Inc.
Erysipelas Serum and Vaccine 11
American Cyanamid Co. 33
American Optical Co.
Hb Meter 48
American Sterilizer Co. 13
Armour Pharmaceutical Co.
L-Povac 34
FSH-p, P.L.H., P.O.P. 35
Arnold Laboratories
B. H. Mange Treatment 6
Bio Laboratories
Hog Cholera Vaccine 43
Bi-Vet Laboratories, Inc.
Medilators 49
Colorado Serum Company
Diagnostic services 6
Corn States Laboratories
Tempacine ..... 2nd cover
Eaton Laboratories
Furacin 16, 17, 29
Entefur 26
Ford Kennels, Inc. 56
Fort Dodge Laboratories
M.L.V. 5
Biotized Bacterins 24
Gaines—General Foods Corp.
Gaines Meal, Gravy Train 47
Greyhound Corporation
Package express service 53
Jensen-Salsbery Laboratories, Inc.
Cytogen ..... 4th cover
Ken-L-Biskit—Quaker Oats Co. 31
Kirschner Manufacturing Co.
Animal cages 55
Massengill, S. E. Co.
Daribiotic 37
National Laboratories
Copron 12 17
Norden Laboratories
Norvac 1
Parke-Davis and Co.
Abdec drops 25
Parlam Corporation
Sebumsol 20
Pfizer Laboratories
Liquamycin 22, 23
Cosa-Terramycin 44, 45
Pitman-Moore Company
Tissuwax 3
Globulon ..... 3rd cover
Profexray, Inc. 41
Reading Body Works, Inc.
Vetro Body 30
Research Laboratories
Pasture Plus 21
Sani-Cage Distributing Co.
Animal cages 42
Schering Corporation
Fulvicin, Fulvidex 32
Schueler and Company
Medi-Sprays 50
Standard Brands
Hunt Club Burgerbits 52
Swift and Co.
Pard 7
Vitamineral Products Co.
Ribad II, Con-o-mineral 36
Warren-Teed Products Company
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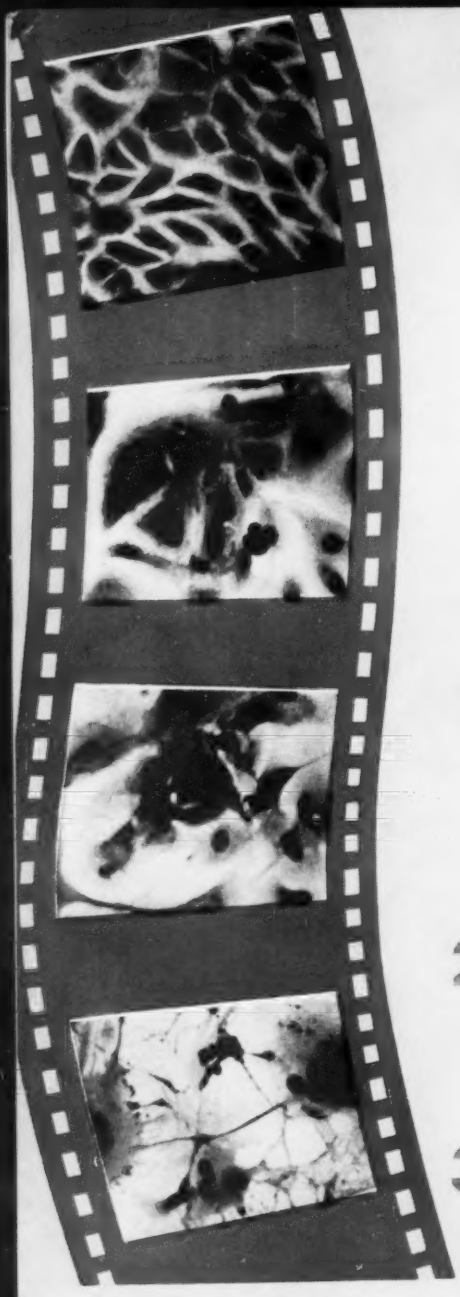
DIVISION OF ALLIED LABORATORIES, INC.
INDIANAPOLIS 6, INDIANA

*A single 20 cc. vial will protect three 65-pound dogs against distemper, hepatitis, and leptospirosis.



In Your Distemper Immunization Program

"Be Cytogen® Sure"

Cytogen: Canine Distemper Vaccine, Modified Live Virus, Canine Tissue Culture Origin, Lyophilized . . . the first modified live virus vaccine produced on dog kidney cells.

1 Be sure of high antigenicity:

To the recognized superiority of a modified live virus vaccine, **Cytogen** adds increased effectiveness where it counts most . . . the strength, quality and antigenicity of the virus itself. As little as ten egg infectious doses of **Cytogen** virus protected susceptible pups from direct challenge[1]. By comparison, 64 to 250 $E.I.D._{50}$ of chick embryo origin virus are required to confer immunity[2].

2 Be sure of rapid response:

When distemper virus is grown in the Jen-Sal canine kidney cell system and becomes **Cytogen** virus, its ability to invade the dog is also enhanced. Susceptible test animals successfully withstood challenge with virulent virus as early as four days after vaccination with **Cytogen**[3].

3 Be sure of maximum stability:

Cytogen contains an exclusive stabilizing agent. With this stabilizer **Cytogen** virus has successfully protected dogs from virulent virus challenge after being artificially aged for a period equivalent to fourteen months of storage at room temperature[4]. For even greater superiority **Cytogen** is held well below freezing from the time it is produced until you receive it.

Cytogen is now available for immediate shipment from your Jen-Sal branch. Order now and "Be **Cytogen** Sure."

Package: 10 — 1 dose vials, with diluent

Clinical and Research References:

1. Sinha, S. K., et al, Studies on Canine Distemper Immunization with a Tissue Culture Vaccine. Vet. Med., Vol. 55, No. 4, April 1960.
2. Burgher, J. A., et al, The Immune Response of Dogs to Distemper. Cornell Vet., Vol. 48, No. 2, 1958.
3. Paton, I. M., et al, Progress in Distemper Immunization. Jen-Sal Small Animal Topics, August 1960.
4. Dept. of Biological Research, Jensen-Salsbery Laboratories. Unpublished Research Data.

another new and exclusive product of Jen-Sal® *research!*

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